

*American*

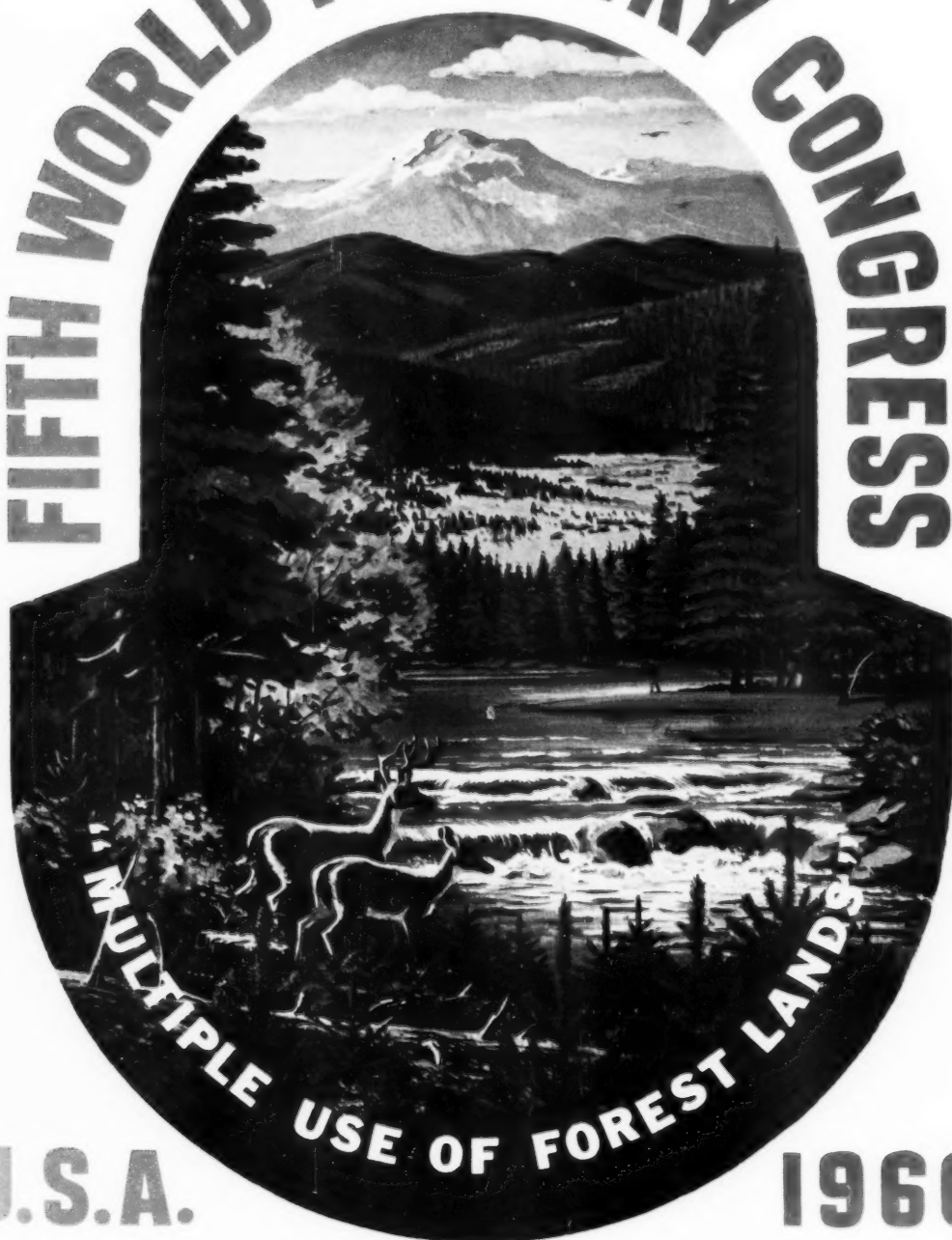
# FORESTS

The Magazine of Forests, Soil, Water, Wildlife, and Outdoor Recreation

AUGUST 1960


50 CENTS

FIFTH WORLD FORESTRY CONGRESS



U.S.A.

1960



# 7 out of 10 chain saw owners *Can't be wrong!*

- When the chips are down, who says "That's the chain for me!"? The saw owner, of course . . . the logger, pulpcutter, farmer, timber worker who has to produce with his saw.

- And year in, year out the country over, on all makes of saws in all kinds of timber, seven out of ten saw owners choose OREGON chain.\*

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- Join 'em! When you buy a new saw, when you replace a worn chain, ask your chain saw dealer for the chain with "OREGON" on every cutter.

\*Data from 1959 survey "The Woodcutting Industry". Details on request.

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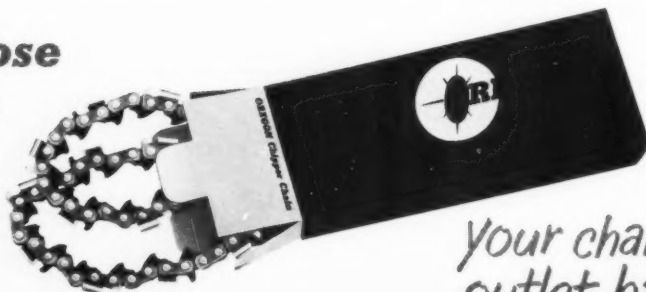
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# American FORESTS

PUBLISHED BY THE AMERICAN FORESTRY ASSOCIATION

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*The American Forestry Association, publishers of American Forests, is a national organization—independent and non-political in character—for the advancement of intelligent management and use of forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is to create an enlightened public appreciation of these resources and the part they play in the social and economic life of the nation. Created in 1875, it is the oldest national forest conservation organization in America.*

**James B. Craig**  
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Vol. 66, No. 8, August, 1960

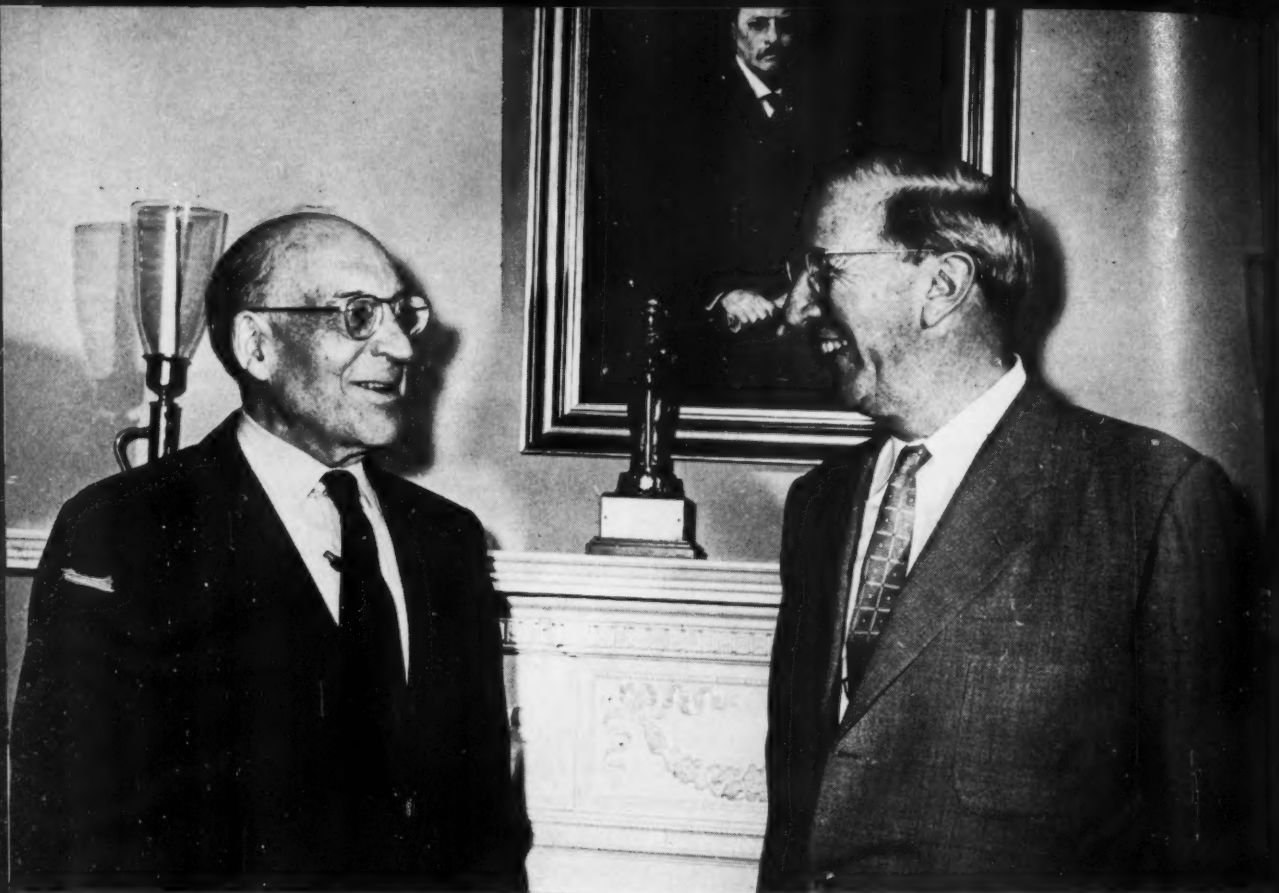
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A special United States commemorative stamp, shown at left, honoring the Fifth World Forestry Congress will be issued in Seattle, Washington, when the congress convenes there later this month. The stamp was designed by Mr. Rudolph Wendelin, staff artist for the U.S. Forest Service, who also designed the U.S. Forestry Commemorative Stamp of 1958. The illustration on the cover of this magazine is the symbol of the Fifth World Forestry Congress, and is also the product of Mr. Wendelin's talent.

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AFA President Don P. Johnston (left) and AFA Vice President Edward P. Stamm stand before portrait of former President Theodore Roosevelt in background. Mr. Stamm is also serving as the chairman of the equipment display at the World Congress

## A Capsule History of AFA

**T**HE American Forestry Association, dedicated to the advancement of intelligent management and use of forests and related resources, is the largest organization of its kind in the world. Founded in 1875, AFA ranks second in years of service as a forestry association, the first being the Royal Scottish Forestry Society organized in 1854.

The 85-year history of AFA is a record of substantial contributions to the promotion of forest policies and practices. One of the earliest achievements of the association was its successful campaign for the establishment of forest reserves on public lands, which were later to become known as national forests. AFA was also instrumental in the creation of the office of commissioner of forests, an office which grew into a major government agency, the United States Forest Service.

AFA has steadfastly worked for sound management of public lands.

Springboards for many of its reforms and programs were four Forest Congresses, the first in 1905. It was re-

(Turn to page 74)

### L'Histoire en Capsule de l'AFA

**L'**Association Forestière Américaine, dédiée à l'avance de l'administration intelligente et à l'emploi des forêts et des ressources s'y rapportant, est la plus grande organisation de son genre dans le monde. Fondée en 1875, l'AFA se classe deuxième en années de service comme association forestière, la première étant le Royal Scottish Forestry Society, fondée en 1854.

L'histoire de l'AFA, dans ses 85 ans, est un rapport de contributions substantielles à la marche en avant des pratiques et des lignes de conduite forestières. Un des premiers accomplissements de l'association était sa campagne heureuse pour

l'établissement des réserves forestières sur les terres publiques, destinées à être connues comme des forêts nationales. L'AFA était aussi instrumentale en la création de l'office du commissaire des forêts, un bureau qui devint une agence fédérale majeure, le Service Forestier des Etats-Unis.

(Turn to page 75)

### Historia en Capsula de la AFA

**L**A Asociación Forestal Americana, dedicada al avance de la administración y uso inteligente de los bosques y sus recursos relevantes, es la mayor organización de su clase en el mundo. Fundada en 1875, la AFA es segundo en calidad de asociación forestal, siendo la primera la Real Sociedad Forestal Escocesa, fundada en 1854.

La historia de la AFA, en sus 85

(Turn to page 70)





FORESTERS FROM MANY LANDS will view Pacific Northwest scenes like this when they visit Weyerhaeuser tree farms in the Pacific Northwest during the 1960 World Forestry Congress, August 29-September 10.

## a warm welcome to Forestry Congress delegates . . .

When you attend the World Forestry Congress, you will be in the heart of the Weyerhaeuser tree farm and manufacturing operations.

We are pleased that your official trip will include a visit to some of these facilities. It is our hope that the tours will give you a better understanding of the Pacific Northwest forest products industry.

As background information, our timberlands include 13 certified tree farms on which timber is managed as a continuous crop. Dominant tree species are Douglas fir, western hemlock, western red cedar, sitka spruce, ponderosa pine, white fir and sugar pine. Manufacturing facilities include lumber, plywood, pulp, paperboard, pulping chemicals, hardboard, particle board, kraft overlaid veneer, wood fiber and bark products. These are located on 12 integrated millsites. Also nearby are our forestry, pulp and wood products research centers.

If you would like to learn more about our American forest products industry, two booklets are available, *Forest Products from Tree Farm to You* and *Tree Farming in the Pacific Northwest*. Write us at Box A, Tacoma, Washington, for your copies.



**Weyerhaeuser Company**

New York Life Presents the 42nd in a Series of Advertisements to Help Guide Young People to a Better Future



## Should your child be a Forester?

by **FREDERICK K. WEYERHAEUSER**

*Chairman, Weyerhaeuser Company, as told to Donald Robinson*

**I**T TAKES bulldog courage to succeed as a forester. Plus a deep abiding faith in the future.

Every day a forester has to fight for the lives of his trees. No sooner does he put a fragile, little seedling into the ground than a rodent may gnaw off its budding branches. Before the tree attains young maturity, a bear may rip away its bark.

Disease may strike the tree at any age, and destructive insects can prey on it. A wind-storm can uproot it. A forest fire may make a blackened corpse of it.

The forester has all these enemies to contend with, and more. He has continually to pit his scientific knowledge and skill against what sometimes seem to be insuperable odds. Even if he wins, he may never see the end results of his struggles. It can be 100 years until the trees he plants have grown tall enough for logging.

But to the right sort of man there are great joys in the profession of forestry. Take Jeff Harris, a veteran forester in the Northwest.

Harris was sent into a section of Oregon that had been swept by a hideous forest fire. For miles nothing could be seen but angry ashes and the gaunt skeletons of dead trees.

He didn't despair. The moment entry into the area was safe, he organized teams of high school boys and with their help hand-planted over 14,000 acres with new trees. That was in 1940.

The other day, Harris flew over the same section. Not a scar left by the fire was visible. The entire vista was green with growing trees.

"Boy, it felt good to see that land lookin' green," Harris said. "Makes a fellow mighty happy to think he can help a dead forest come back to life."

### Protector of Vital Resources

Foresters are the key men today in preserving this nation's proudest heritage—our 664,000,000 acres of forest land.

Foresters are also the key men in one of the nation's largest, most important industries—timber products. For we should remember that forests exist to be used. We must have their products to live.

Today some 489,000,000 acres of forest area are in commercial use. The federal government, the states, and local governments own and harvest commercially twenty-seven percent, about 132,000,000 acres. The remaining 357,000,000 acres are owned and harvested privately.

These forests support an industry with less than 1,640,000 employees and a volume of \$25,000,000,000 a year! Out of the forests come the world's oldest and newest products: lumber for construction and furniture; paper for printing and 1,000 additional purposes; cellulose for ammunition, and photographic film; pharmaceuticals; sugar, ethyl alcohol, plastics, and countless more.

### Many and Varied Duties

The forester's part in all this is to help the forests to grow and see that they are wisely used. His function has been well defined: "the scientific management of forests and forest lands."

It's an enormous job. Each forester must be able to survey forest areas, build roads, determine the volume of trees in an area and estimate how fast they are growing—no easy assignment when millions of trees are involved. He must supervise the cutting of timber, and the reforestation that follows.

He must know treatments for tree diseases and ways to beat back rampaging insects. Right now, a tiny killer called the balsam woolly aphid is sucking the life out of hundreds of thousands of beautiful white fir trees in Washington and Oregon. It's a pathetic sight.

But we have hope of a solution. Foresters have found a special fly in Czechoslovakia that feeds on these aphids. They've rushed them over and set them to work in our woods. Results have been most encouraging.

The forester must know repellents for defending forests against animal damage. He must know means of safeguarding forests against the hazards of wind and snow. Most of all, he must know methods for preventing forest fires, and for fighting them if those horrors get going.

### The Need for Foresters

The demand for qualified foresters is something startling. They number 17,000 already, and it's not enough. The forty colleges of forestry graduated 1,470 young men last year, and more jobs were available than were people to fill them. Approximately 5,000 foresters are employed by the U.S. Forest Service to work the national forests, manage forest ranges, and supervise recreational facilities. More foresters are hired by the National Park Service and other federal agencies.

About 2,000 foresters are employed by states, counties and municipalities to run public-owned forests, direct fire control operations, and assist small owners who cannot afford foresters of their own.

Then there are the 9,000 or so foresters in private industry. They can be found in every part of the country, growing trees and profits. Because of the nature of their employment, their duties tend to be more varied than are those of government men.

Some 200 foresters have set up as private consultants, and most are doing very well. Eight hundred are engaged in college teaching.

Opportunities for promotion are excellent in all fields. In government service, one goes from timber cruiser to district forest ranger and on up to be chief of forestry for a state or the federal government.

In industry, within ten years one can be a branch forester and have personal charge of 100,000 acres. From there the next step is managing a forest with responsibility for millions of acres.

Forestry can also be a stepping stone to advancement in other lines, such as sales, public relations, administration, education.

The pay? It is not as high in the early years as it is in some other professions. However, it should be adequate, especially when it is recognized that young foresters are usually stationed in small towns.

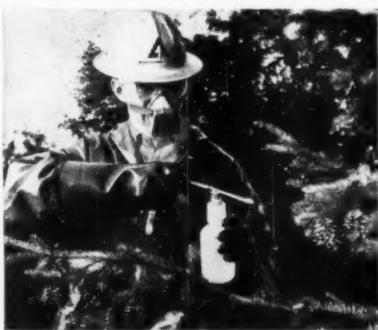
In the U.S. Forest Service, the salaries go from \$4,490 to \$17,500. State salaries generally begin a little above the federal.

A forester who goes into industry can anticipate \$4,200 to \$5,400 to commence. Research men with graduate degrees will do better; they'll begin at \$6,000 to \$7,500. Later on, if they're of outstanding calibre, industrial foresters may draw \$15,000 to \$20,000. Successful private consultants can earn more.

### Special Rewards

But the attraction of forestry is not money. It is the beauty, physical and spiritual, of the outdoors. It is the pleasure of working with living things, and the thrill of growing majestic trees that may last for generations. It is the clean, vigorous healthy life. Look at any old-time forester. You'll be amazed at his youthful vigor.

It is the chance to travel. "I never dreamed of seeing so much of the world," a young forester wrote me. He'd been working in India and now he was en route to Brazil.



This forester, dressed in protective clothing, is evaluating an insecticide. Through such research, foresters find better ways to control tree diseases and insect damage.

It is the superb sense of comradeship that comes from serving with other dedicated men.

There is a darker side to the coin, of course. The work can be hard, dirty, cold, wet, exhausting. And dangerous. The hours are long and irregular. A forester is frequently away from home for days on end.

It can be very trying on his family. The wife of a forester I know gave birth to two children in the past seven years, and her husband could not be with her in either case. He was off fighting fires.

"I didn't blame him," the poor woman said, "but I sure missed him."

Living in a small town, miles from anywhere, with limited recreational facilities, can be very hard, too. So is the constant shifting from one post to another.

The question arises as to how you can tell if a boy has the makings of a future forester.

He should have a deep love for nature and the outdoors. He should have a strong physique and enjoy roughing it. He should be the sort of a lad who keeps his head in emergencies.

I'm thinking here of a forester who was ringed in by a raging forest fire. He didn't panic. He buried himself in the ground until the fire passed overhead, and escaped unscathed.

Certainly, each prospective forester must have a generous stock of patience and optimism. He should be able to get along with people, and express himself well on his feet. He'll be doing a lot of public speaking to conservation groups. He must be a keen student, especially in the sciences.

### College Essential

At least a four year college course is now required to become a forester. A boy planning such a career would be wise to study as much mathematics and English in high school as possible. Not long ago, the University of Washington conducted a survey to see why some forestry students failed to graduate.



As part of his scientific management of forests, the forester must supervise the cutting of timber so as to make the most efficient use of these important resources.

In almost every instance, it was due to inadequate preparation in mathematics and English.

Does this profession have room for women? A few, perhaps, in the research laboratories. In the main, it's a man's job. Over the course of the past fifty years, many girls have enrolled in the University of Washington's College of Forestry. Only two ever succeeded in graduating. Neither is still practicing forestry.

They have done the next best thing. They married foresters.

### ABOUT THIS ARTICLE...

Since 1953, New York Life has been presenting advertisements like this to help parents and their children plan for the future. This particular message appears in *The Saturday Evening Post*, July 30; *Look*, Aug. 2; *Life*, Aug. 8; *Scholastic*, Sept. 14. It is reproduced here because of the special interest it may hold for readers of this publication. As noted below, this article is available in booklet form without charge. Quantity reprints can be requested by interested companies, schools, professional groups, and other organizations.

### Booklets Available on Many Careers

This article is available in booklet form without charge. Also available are a list of similar articles on forty-one other careers, which you may send for, and the helpful, informative booklet, "Planning a College Education." We'll be glad to send you any or all of these on request. Just drop a postcard to:

# New York Life



## INSURANCE COMPANY

Career Information Service

51 Madison Avenue, New York 10, N. Y.

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INSURANCE COMPANY





## HUGH H. BENNETT

By DONALD A. WILLIAMS

*Administrator,  
Soil Conservation Service*

**Dr. Hugh H. Bennett, the  
father of soil conserva-  
tion in the United States**

IT IS much too early to appraise fully the conservation contributions of Hugh Bennett to the world that he has left. A better measure of the impact of his life's work will be the status of people everywhere 50 years hence in their eternal struggle to live in harmony with their natural resources.

To appraise the work of Hugh Bennett, even as of today, and to do so objectively, is especially difficult for one who for a quarter of a century was a member of his staff and presently heads the agency that he built. It is impossible to separate the man, Hugh Bennett, and the idea, soil conservation. The man and the idea were one and the same. They came together on a sheet-eroded field in middle Virginia on a spring day 55 years ago.

"From then on," as Santford Martin, one of his biographers, expressed it, "his career led uphill, up gullies

most of the way, until he caused farm and town people alike to identify themselves with soil conservation."

Hugh Bennett was a man with a single purpose. He pursued that purpose tirelessly and relentlessly all the days of his life. For nearly half a century he carried on a militant crusade against soil erosion and on behalf of an action program to protect and improve the nation's soil and water resources. More than any man, he was responsible for our national soil and water conservation and watershed protection programs that extend into virtually every corner of the United States, and for the development of similar programs in some 18 other countries.

There, in one sentence, is a summation of Hugh Bennett's legacy to the people of the United States and to the people of the world. But the

(Turn to page 80)



FOUNDED 1875

# THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH STREET, N. W., WASHINGTON 6, D. C.

Dear Member:

Circle the dates of October 16-19 on your calendar!

These are the dates for the 85th Annual Meeting of The American Forestry Association, to be held at the Edgewater Gulf Hotel, Edgewater Park, Mississippi. You and your friends are cordially invited to attend this important meeting to be held on the beautiful Gulf Coast of Mississippi. One need not be a member to attend.

The Edgewater Gulf Hotel is situated directly on the Gulf of Mexico in the midst of 700 acres of beautifully landscaped grounds providing a wide array of recreational opportunities, including golf, tennis, swimming, and deep sea fishing.

We promise you four days of interesting and entertaining activity, commencing with registration at 1:00 o'clock P.M. on Sunday, October 16, and concluding with the Annual Banquet on Wednesday evening, October 19, featuring the famed Keesler Male Chorus, from the Keesler Air Force Base, Biloxi, Mississippi.

A Plantation Dinner Party will be held Sunday evening on the Terrace, outstanding speakers will participate in the program on Monday and Wednesday and Tuesday will include an all-day field trip and barbecue to the famous Bogalusa, Louisiana plantations of the Crown Zellerbach Corporation.

Make your reservation today by writing direct to the hotel, and confirmation will be sent you promptly. Reasonable rates on the European plan are as follows:

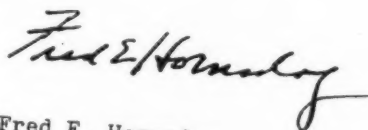
\$4.00 to \$7.50 per person with two people occupying a twin bedroom

\$5.50 to \$11.00 for one person occupying a single room

Suites — corner parlor with twin bedroom on each side of the parlor —

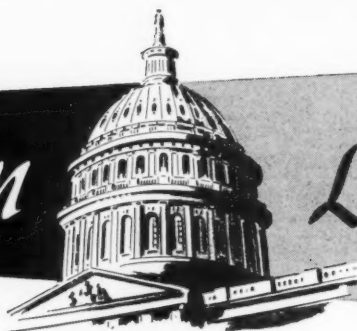
\$14.00 for the parlor and \$14.00 for each bedroom.

We hope to see you at Edgewater Park.



Fred E. Hornaday  
Executive Vice President

# Washington



# Lookout

By ALBERT G. HALL

## DEMOCRATIC PLATFORM EMPHASIZES FEDERAL AC-

tion. Budgeting of natural resource expenditures so as to distinguish between operating expenses and capital investments is recommended by the Democratic Party in its platform for the national elections this fall. Purpose is to provide an accurate accounting of costs and returns. Also proposed is the creation of a council of advisors on resources and conservation in the Executive Office of the President to evaluate and report annually on resource needs and progress in resource development.

## BALANCED LAND AND FOREST POLICIES INVOLV-

ing intensive forest management on a multiple use and sustained yield basis, reforestation of burnt-over lands, public access roads, range re-seeding and improvement, intensive work in watershed management, concern for small business operations, and free access to public lands for recreational use are part of the platform promises.

## THE DEMOCRATS PROPOSE TO DEVELOP A COM-

prehensive national water policy with a multiple-purpose plan for each major river basin, including the development of hydroelectric facilities and additional reclamation projects, and stepping up research on, and control of, stream pollution.

## EXTENSION OF RECREATION OPPORTUNITIES IS

also emphasized in the platform: "We must act quickly to retain public access to the oceans, gulfs, rivers, streams, lakes, and reservoirs, and their shorelines and to reserve adequate camping and recreational areas while there is yet time. Areas near major population centers are particularly needed. . . . The National Park System is still incomplete, in particular the few remaining shorelines must be included in it. A National Wilderness System should be created for areas already set aside as wilder-

ness. The system should be extended but only after careful consideration by the Congress of the value of areas for competing uses."

## MOST OF THE PLATFORM PROMISES ARE ALREADY

before the 86th Congress as legislative proposals, and since nominees Senator Kennedy and Senator Johnson have indicated they will move toward realization of the platform even before the election, it is likely that Senate action will take place on at least some of the conservation planks.

## ANOTHER WILDERNESS BILL, PROPOSED BY SEN-

ator Murray of Montana, appears to stand a chance of Senate committee approval before the adjournment of the 86th Congress. Murray, chairman of the Senate Committee on Interior and Insular Affairs, in developing the new bill, S. 3809, has considered the many proposed amendments to the original measure and has accepted those of a clarifying nature. His bill, to which Representative Saylor of Pennsylvania has introduced a House companion, H.R. 12951, would blanket in, as a starter in a wilderness system, all the areas within national forests now administratively designated as wilderness. Other areas, within the national forests and parks, could be included at later dates upon recommendations by the Secretaries of Agriculture or Interior. The Montana Senator ties his proposal to the recent Congressional endorsement of multiple-use as the concept of management for national forests. The Multiple-Use Act, Public Law 86-517, spells out wilderness preservation as a purpose of national forest establishment, equal to other national forest purposes. Since the establishment of a wilderness system is one of the promises of the Democratic platform, the chances are good for Senate action on the Murray measure. House action may be more difficult to assure in this session.

## The Fifth World Forestry Congress

This issue of AMERICAN FORESTS is dedicated to the greatest gathering of foresters history has ever known. Greatest numerically, greatest in nations represented, greatest in its scope of activities and in the human values involved.

It could scarcely be otherwise. For although the word *forestry* has not changed since the days of the First World Forestry Congress, what it actually comprises today is vastly wider, more complex, and more deeply interwoven with our economic fabric.

When, in 1926, the nineteen U.S.A. delegates gathered in Rome for that first Congress, not one of them could have dreamed of the advances in method and knowledge that lay ahead. The revelations of the electron microscope were still to come. Tree genetics, in the sense that we know it now, was little more than a hope. Forest inventories enjoyed none of the benefits to be introduced by electronic computers. In something less than forty years, forestry has thrust far forward into the unknown.

And each succeeding Congress has served as a milestone to mark this forward march of forestry and its expanding fields. Each Congress has grown in stature and in public recognition, as a crowding world begins to look a little fearfully at its waning resources.

As forestry has matured, specialization has become inevitable. All this marks healthy growth, but it carries the danger of professional isolation. Working each in his own highly specialized field, the foresters of today tend to lose the sense of a common goal, the sense of shared objectives that was so strong a force in forestry of earlier times. World Congresses help restore this realization of forestry's essential unity, for they bring together men working in all of its related disciplines throughout the world.

It is appropriate that the United States should play host to these foresters from foreign lands. For from the very first, forestry and foresters in America have gained much from their colleagues in the older countries. Germany and France particularly served as models on which were patterned our own forestry beginnings.

Since the days of Gifford Pinchot, American foresters have been alive to the enduring benefits that come from these international gatherings. Americans have been active in many European organizations, and have attended all World Congresses, but not until the latter days of World War II did they play a decisive role in world forestry. At that time the Food and Agriculture Organization (FAO) had just been established within the United Nations, and a Forestry Division

was proposed. There arose strong opposition to its inclusion, even within FAO itself, and more than one member of the U. S. Congress was vocal in his objections to spending American dollars for what might have seemed so visionary an end.

Forestry in the United States was wavering between isolation and international co-operation when President Franklin Roosevelt voiced his own approval of a permanent organization devoted to world forestry within FAO.

To the task of formulating the functions of the new organization, Lyle Watts, then Chief of the U. S. Forest Service, gave unstintingly of his talent and time. International forestry owes him a perpetual debt, for the value of his personal support and of his long administrative experience would be hard to overestimate. Due in large part to his counsel, the sponsoring of World Forestry Congresses has become a continuing function of FAO.

The benefits that flow from these Congresses go far beyond the technical. Forestry still has need of the public acceptance and public recognition that these World Congresses stimulate. For the price of forestry, as of democracy itself, is eternal vigilance. Changing governments bring changing attitudes, and all the gains of yesterday can be quickly obliterated. Wherever great values are involved—as in forests and range lands—the predators are never far away. Forestry is safe only to the extent that behind it is an informed and, if need be, militant public opinion. Even today, in more than one newly born nation, rational forest management is being jettisoned, and the forests parceled out for private gain among the politically strong. For a long time to come, there will be need of strengthening national forestry programs through the recognition and the impetus that these World Congresses invoke.

Each Congress has had to deal with new problems and new challenges. No past Congress has faced the picture of rapidly emerging nations as does this one. It may well be that among the consequences of the Fifth World Forestry Congress will be help in guiding these nations toward sound forest policies and so avoiding the costly errors made by older states.

For whatever the country, whatever its politics, ideologies, or governmental pattern, the overall goal of forestry remains unchanged—to make the world's forests contribute their highest service to the welfare and happiness of man.

TOM GILL

(Turn to next page)

# El Quinto Congreso Forestal Mundial

Esta edición de AMERICAN FORESTS está dedicada a la más grandiosa reunión de técnicos forestales que haya conocido la historia. La más grande numéricamente y por las naciones en ella representadas, así como por el alcance de sus actividades.

No podría ser de otro modo, porque aunque la palabra *forestry* no ha cambiado desde el primer Congreso Mundial Forestal, lo que verdaderamente encierra esa palabra en la actualidad es un significado much más amplio, más complejo y más profundamente interrelacionado con nuestra vida económica.

Cuando en 1926 los diez y nueve Delegados de los Estados Unidos se reunieron en Roma para ese primer Congreso, ninguno de ellos podría haber soñado en los avances de los conocimientos que verían en el futuro. La revelación del microscopio electrónico aún estaba por venir, el mejoramiento genético de los árboles en la forma en que lo conocemos ahora, eran en ese tiempo solamente una esperanza. No se gozaba entonces de los computadores electrónicos para hacer los inventarios forestales. En algo menos de cuarenta años la ciencia forestal ha avanzado a grandes pasos hacia lo desconocido.

Cada Congreso que se ha efectuado ha sido un punto importante que ha marcado la marcha hacia adelante en el estudio silvícola y en otros campos derivados de esta ciencia, y cada Congreso ha crecido en estatura y en el reconocimiento público, al mismo tiempo que un mundo sobreprolado comienza a mirar con un poco de miredo que sus recursos naturales van desapareciendo.

A medida que el estudio de los bosques ha madurado, la especialización ha venido a ser inevitable. Todo esto indica un saludable crecimiento, pero lleva consigo el peligro de un aislamiento profesional. Cada técnico forestal moderno trabajando en el campo en el cual se ha especializado, tiende a perder el sentido de la unión para un fin común, el sentido de compartir los objetivos, que en los primeros tiempos era una gran fuerza de unión. Los Congresos Mundiales ayudan así a restaurar este objetivo o sea la unidad esencial entre los técnicos forestales y a unir a todos los hombres que trabajan en el mundo en estas disciplinas científicas o conectadas con ellas.

Es bueno que los Estados Unidos reciba a los forestales de otros países, porque desde hace muchos años los bosques y los forestales en América han tenido una deuda hacia sus colegas de los países mas viejos. Particularmente Alemania y Francia sirvieron como modelos nuestros.

Desde los días de Gifford Pinchot, los forestales norteamericanos han estado siempre listos para aprovechar todos los beneficios que se derivan de estas reuniones internacionales. Los norteamericanos siempre han estado presentes y actuado en forma activa en muchas organizaciones Europeas y han asistido a todos los Congresos Mundiales, pero fue hasta los últimos días de la Segunda Guerra Mundial cuando ellos tomaron parte decisiva en el estudio mundial de la ciencia forestal. En ese tiempo la *Food and Agriculture Organization* (FAO) acababa de ser establecido dentro de las Naciones Unidas y fue propuesto un Departamento

Forestal. Hubo una fuerte oposición, aún dentro de la misma FAO, y mas de un miembro del Congreso Norte Americano publicamente se opuso al gasto de dólares americanos por lo que parecía ser una idea visionaria.

La ciencia forestal en los Estados Unidos estaba titubeando entre el aislamiento o la cooperación internacional, cuando el Presidente Franklin Roosevelt expresó su propia aprobación a la creación de una Organización permanente dedicada al estudio del mundo forestal que debía de formar parte de la FAO.

Para la tarea de organizar las funciones de la nueva entidad, Lyle Watts, en ese tiempo Jefe del Servicio Forestal de los Estados Unidos, dió toda su cooperación, su gran talento y su tiempo. La ciencia forestal internacional tiene con él una gran deuda de gratitud. El valor de su apoyo personal y su larga experiencia administrativa será muy difícil de ser estimado, y debido en gran parte a sus consejos los Congresos Forestales Mundiales han venido a constituir una función permanente de la FAO.

Los beneficios que se derivan de estos Congresos van más allá de las cuestiones meramente técnicas. Todavía la ciencia forestal tiene necesidad del reconocimiento y la aceptación pública y por eso estos Congresos deben servir como estimulantes, porque el precio de los bosques, como el de la democracia, es de una eterna vigilancia.

Algunas veces los gobiernos que cambian traen cambios y diferentes puntos de vista, y todas las ganancias que se hayan anteriormente pueden ser borradas en un momento. En donde quiera que se ven envueltos grandes valores, como en los bosques y en las vastas extensiones de pastos, los predadores nunca están muy lejos. Los bosques estan a salvo siempre y cuando haya una opinión inteligente que los respalde y, si es necesario, una opinión pública combativa. Aún hoy, en más de una de las naciones recién nacidas con una razonable administración forestal, ésta viene siendo debilitada y los bosques parcelados como ganancias privadas entre los políticos que tienen influencias. Por mucho tiempo en el futuro habrá necesidad de fortalecer los programas forestales nacionales por medio del reconocimiento y la fuerza que esos Congresos logren imponer.

Cada Congreso ha tenido que tratar con nuevos problemas y nuevos desafíos. Ninguno de los Congresos anteriores ha afrontado el cuadro del rápido surgimiento de nuevas naciones, como este Congreso tendrá que afrontar. Sería bueno que entre los resultados del Quinto Congreso Forestal Mundial, se ayudará a esas Naciones y se les guiará hacia una política forestal inteligente, para que se eviten los costosos errores cometidos por naciones más antiguas. Porque cualquiera que sea el país, cualquiera que sean sus políticas, ideologías, o formas de gobierno por encima de todo, la finalidad y el ideal de la ciencia forestal permanece sin cambio: o sea el hacer que los bosques mundiales contribuyan en su forma más alta al servicio, al bienestar, y a la felicidad del hombre.

TOM GILL



# Le Cinquième Congrès Forestier Mondial

AMERICAN FORESTS dédie ce numéro au plus grand rassemblement de forestiers effectué dans l'histoire du monde. Le plus grand, il l'est, tant numériquement que par le nombre des nations participantes, tant par l'étendue de ses activités que par les valeurs humaines engagées.

Il ne pouvait guère en être autrement. Car si le mot *forestry* n'a pas changé depuis l'époque du premier congrès mondial de sylviculture, il dénote aujourd'hui cependant quelque chose de plus étendu, de plus complexe et de bien plus intimement lié à notre structure économique.

Lors de la réunion à Rome, en 1926, pour ce premier congrès mondial, pas un des dix-neuf délégués des Etats-Unis n'aurait pu concevoir les avancées méthodologiques et scientifiques qui allaient venir. Le microscope électronique n'avait pas encore apporté ses révélations. La génétique de l'arboriculture, au sens actuel du mot, n'était encore qu'un simple espoir, ou peu s'en faut. Les inventaires forestiers ne bénéficiaient d'aucun des avantages que devaient introduire les ordinateurs électroniques. En moins de quarante ans environ, la sylviculture a pénétré profondément dans l'inconnu.

Et chaque congrès successif a été comme un jalon soulignant les progrès de la sylviculture et l'expansion de ses domaines. Chaque congrès a grandi en stature et en considération publique alors qu'un monde surpeuplé commence à porter un oeil appréhensif sur ses ressources en déclin. Avec ce développement de la sylviculture, la spécialisation est devenue inévitable. Tout ceci fait preuve sans doute d'une saine croissance mais comporte également le danger d'une isolation professionnelle. En travaillant, chacun à sa sursoécialisation, le forestier de nos jours tend à perdre le sentiment d'un but commun, d'objectifs mutuels, sentiment qui faisait la grande force de la sylviculture d'autrefois. Les congrès mondiaux contribuent au rétablissement de l'unité essentielle de la sylviculture, car ils mettent en contact personnel des gens qui, dans le monde entier, ont un travail dans toutes ses branches apparentées.

Il convient que ce soient les Etats-Unis qui remplissent les fonctions d'hôte auprès de ces forestiers venant des pays étrangers. Car, dès le début, la sylviculture et les forestiers américains sont endettés à leurs collègues des nations plus anciennes. L'Allemagne et la France en particulier ont servi de modèles à nos premières tentatives forestières.

Depuis l'époque de Gifford Pinchot, les forestiers américains reconnaissent les bénéfices durables qui découlent de ces réunions internationales. Les Américains ont participé activement à de nombreuses organisations européennes et ont assisté à tous les congrès mondiaux; cependant, ce n'est que vers la fin de la deuxième guerre mondiale qu'ils ont joué un rôle décisif dans la sylviculture mondiale. A cette époque, la *Food and Agriculture Organization*

(F.A.O.) venait d'être instituée sous l'égide des Nations Unies et on avait proposé la création d'une division forestière. Il s'éleva au sein de la F.A.O. elle-même une forte opposition à son inclusion et plus d'un législateur américain fit des objections bruyantes à l'idée de dépenser des dollars américains pour ce qui pouvait sembler un but si chimérique.

Aux Etats-Unis, la sylviculture vacillait entre l'isolation et la coopération internationale, quand le Président Franklin Roosevelt fit savoir que, personnellement, il était en faveur d'une organisation permanente, établie au sein de la F.A.O. et consacrée à la sylviculture mondiale.

Lyle Watts, alors chef du *U. S. Forest Service*, ne ménagea ni son temps ni ses talents à la tâche de définir les fonctions de la nouvelle organisation. La sylviculture internationale lui doit une grande dette. Il serait difficile de surestimer la valeur de son appui personnel et de sa longue expérience administrative. En grande partie grâce à ses conseils, le soutien des congrès mondiaux de sylviculture est devenu une des responsabilités continues de la F.A.O.

Les bénéfices qui découlent de ces congrès dépassent de beaucoup l'apport technique. La sylviculture a encore besoin de l'accueil favorable et de l'acceptation par le public que ces congrès mondiaux stimulent. Car le prix de la sylviculture, comme celui de la démocratie elle-même, est une vigilance éternelle. Les changements de gouvernement amènent des changements d'attitude et tous les gains d'hier peuvent être rapidement engouffrés. Là où il s'agit de valeurs importantes—comme dans les forêts et les pâturages—les rapaces ne sont jamais bien loin. La sylviculture ne se sent en sûreté que dans la mesure où elle est épaulée par un public renseigné et militant au besoin. Même aujourd'hui, dans nombre de nations nouvellement créées, une gestion forestière rationnelle est souvent rejetée; on répartit les forêts parmi les politiciens au pouvoir pour leur gain personnel. Pendant longtemps encore, on aura besoin de resserrer les programmes forestiers nationaux en s'appuyant sur l'acceptation et l'impulsion que ces congrès mondiaux suscitent.

Chaque congrès a dû faire face à de nouvelles questions et à de nouveaux défis. Aucun congrès passé n'a été confronté, comme celui-ci, par le fait de l'émergence rapide des nations nouvelles. Il se pourrait bien qu'on place parmi les résultats du cinquième congrès mondial de sylviculture l'aide apportée à ces nations pour les mettre à même de pratiquer une politique forestière saine et d'éviter les erreurs coûteuses de leurs aînées.

Car quel que soit le pays, sa politique, son idéologie ou son mode gouvernemental, le but général de la sylviculture ne change point—faire en sorte que les forêts de la terre contribuent de leur mieux au bien-être et au bonheur des humains.

TOM GILL

# FOREST

## The Story

IN 1952, J. N. Köstler, then professor of silviculture at the University of Munich and one of the leaders in this field, wrote: "From the standpoint of conservation and soil care it will be necessary to convert at least 1.2 million hectares of artificial single-species stands into locally-suitable mixed stands within 40 to 50 years." Knowing that this is proposed for the region of southern Germany alone—that 1.2 million hectares constitute more than a third of the forest acreage there—



This first generation stand of high-yielding Norway spruce is estimated to be between 40 and 50 years old.

Second generation Norway spruce stand, also 40 to 50 years old, is beginning to show signs of deterioration.



# FORESTRY ABROAD

## Struggle for Mixed Forests By RICHARD PLOCHMANN

the scope of this task becomes understandable. The task is not lesser in northern Germany than in southern Germany: to the contrary. The conversion of locally-unsuitable single-species stands is today one of the most important and urgent problems of our silviculture.

How could such a problem have arisen in a country in which over 200 years ago the concept of conservation—the primary principle of any genuine forestry—was developed? In a country whose silviculture

was long considered by many as exemplary and a standard? How could it come to such a state of affairs? What can otherwise happen? Such are the questions heard repeatedly in Germany today. Over and beyond the region of the validity of these questions, an answer to them may also evoke interest there where people are fortunate enough not to have to struggle with the attendant phenomena of artificially established single-species stands. If we would understand the causes of to-

day's wretched state of affairs and evaluate the methods being advocated for its eradication, then we cannot desist from a rough sketch of the natural stands and a brief description of the development of our forests during the last 200 years.

In the natural forests of the central European deciduous forest regions of the entire west and north—even in large parts of the south—of Germany, *Fagus silvatica*, *Quercus pubescens*, and *Quercus robur* were the dominant species, accompanied

A thicket of oak and beech trees growing in what was previously a stand of pure spruce.



Combination of spruce, pine, and beech are creating a mixed forest from stand of beech.





During the past 20 years this 80-year-old stand of pure spruce has been reverting to a mixed forest of beech and spruce trees through the shelterwood method.

Ideal mixed stand contains spruce, European larch, pine, beech, oak, and other hardwoods. It is 70-80 years old.

by a small number of other deciduous trees (European species of alder, ash, hornbeam, maple, *Prunus*, *Sorbus*). Where poor sandy soils hindered the thriving of the beech, *Pinus silvestris* (Scotch pine) occurred as the sole coniferous tree. Even in the high-lying parts of the Harz, in the mining region of the central mountain chain of southern Germany, and on the northern edge of the Alps, deciduous forests were replaced by deciduous-coniferous mixed forests in which there was a mixture of *Fagus silvatica*, *Abies alba* (white fir), and *Picea abies* (Norway spruce). Coniferous forests consisting of *Picea abies*, and partially of *Larix europaea* and *Pinus cembra*, grew only in the sub-Alpine region of the Alps. Only in a few places—in the highlands of the Alps and the Bavarian Forest, as well as on extremely poor soils in lower-lying regions—were there natural single-species stands, whose share in the total forest acreage was very small. Disregarding these exceptions, the natural forest of Germany was a mixed forest.

When the planned management of these forests was begun about 200 years ago, virgin forests were pres-

ent only in the insignificant remaining areas of remote regions. Large parts of the forest were cleared and used for agricultural purposes. That which remained had more or less lost a large part of its natural composition. Large areas were converted into forests of low and medium-tall trees or served as cattle pastures and swine meadows. Within them the oak and hornbeam were given preference, and the beech had to recede. Salt production, glassmaking, iron smelting, and hammer mills, which sprang up mainly in the densely wooded central mountains and on the northern edge of the Alps, preferred spruce, fir, and pine and gave little value to beech, which could not be floated. At the beginning of planned forest management, the state of these forests was predominantly very poor. Centuries of uncontrolled use, just as constant wars and the continued poverty of clerical and lay owners, had led to an overstraining of the forests, the extent of which was so great that a shortage of wood appeared imminent. In this there was grave danger at a time when, without coal and oil, everyday life was much more strongly dependent on wood than today. The fear of





such gave rise to the most urgent call for an efficient forest management, the setting up of capable forestry administrations, the establishment of schools of forestry, the development of methods of ascertaining the state of forests and caring for them. This developmental phase of planned forestry, which occurred in Germany from about the mid-eighteenth to the mid-nineteenth century, as already mentioned, originated from the concept of conservation, which in this period was understood as the conservation of use: that is, in the future no more was to be used than the coming generations had a right to expect to use.

A main task of the forestry men of that period consisted of the reconstruction of the excessively exploited, wasted, and cleared forests into stands capable of giving return. If in regard to this goal there were no differences among the men concerned, the views regarding the methods with which this was to be attained were essentially less uniform. One of the most important and influential foresters of that time (G. L. Hartig) propagated from economic and biological considerations the establishment and growing

of pure stands. Opposed to this view were some of his prominent contemporaries (H. Cotta, W. Pfeil). Pfeil wrote as early as 1821, for example: "There where soil and climate permit the cultivation of mixed stands, these always take preference over pure stands." Actually, intentionally or unintentionally, the result was more natural and artificial regenerations of the pure stand. In deciduous forests, the then everywhere-applied natural regeneration process of the shelterwood system frequently led to a one-sided preference of the beech to the exclusion of the oak and other deciduous species; in coniferous forests, on the other hand, to an advance of the spruce at the expense of the fir and beech. Where natural regeneration was not possible from the viewpoint of the locality or the stand—and this drawback was present over extensive areas—artificial planting succeeded in establishing mixed regenerations only in rare cases. These areas were restocked predominantly with pure young spruce and pine trees or plantations, whereby the limits of the natural distribution of these species were widely exceeded. At

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# FORESTERS L

Foresters of northern Europe are successfully improving soil conditions in that cold climate through interesting thinning techniques



# LOOK TO THE SOIL!

IN the many discussions among American foresters concerning thinning problems in young, second growth stands, no references to soil condition as influenced by thinning techniques are generally heard.

This is probably due to the fact that little information on the connection between thinning techniques and soil improvement has been available in the United States. However, this common European forestry practice has demonstrated that when frequent thinnings are made there is an improvement in soil condition.

Success of this practice is easier to determine in northern and western Europe, where four or five hundred years of overgrazing and depletion has led in many cases to a generally inferior soil condition. In contrast, however, most western European lowland forests grow on lands which were cultivated, then depleted, and then reforested, as well as having been burned at intervals and steadily overgrazed until new methods introduced in the 19th century began to change the picture.

Fertilization, following the development of modern transportation, has brought a revolutionary increase in productivity of agricultural land, and in most cases permitted areas which happened to be in trees to remain in forestland. To a great extent, these depleted areas suffered from a lack of available soil nutrients and, as a consequence, they often developed great acidity, giving way to a raw humus formation even-

By FLEMMING JUNCKER

tually followed by podsolation on poorer soils.

As the need for extensive forest grazing gradually increased in the European countries and the practice of silviculture developed, soil condition became a problem of great interest. Russian, German, and Scandinavian soil scientists had an excellent opportunity to study these conditions because of the wide variations in forest soils, a condition that is not so prevalent in North America. It is therefore quite natural that European experiences in this field may be of special interest to American foresters in adapting thinning techniques to the special forest conditions of North America's second growth forests.

In the soil under the young, unthinned, even-aged stand there exists a strong competition for nutrients, of which nitrogen and in certain periods water may be at a minimum. During the two dry months the trees must feed on the accumulated water resources of the soil, which are largest in a soil of high humus content. The loose condition of a naturally well-protected topsoil is more or less destroyed by the clear cutting process, partly by the heat of the sun and partly by the heavy traffic during timber harvesting. This reduces its water-holding capacity. The young stands therefore often grow on a soil which is in a far from optimal condition with regard to ability to accumulate water from the wet

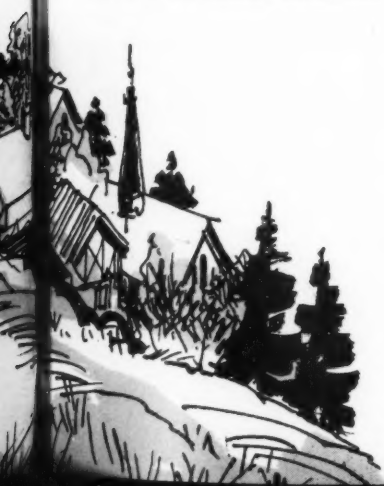
season for use in the dry one.

The nitrogen cycle in the soil is, under well-protected normal conditions, maintained by an annual addition of organic waste (needles, decaying weeds, etc.) containing in average two per cent nitrogen from which, by chemical and biological actions, close to 40 per cent durable humus (containing four to five per cent nitrogen) is formed.

By a pH (*pH is a technical method of measuring soil alkalinity or acidity in which a value of 7 is neutral—Editor*) above 8 and below 4.5 durable humus compounds are to a great extent water soluble and may be leached to some extent. At the normal soil pH of 4.6 to 5.6 they will generally accumulate in the topsoil to a certain depth until there is a balance between formation and breakdown.

The normal rate of annual breakdown (oxidation) of the durable humus will, under well sheltered conditions such as those in the northern United States lowland forest soils, be in the order of size of one per cent, increasing and decreasing with average temperature, decreasing with increased shade, and increasing rapidly when exposed to sun and air, when worked by ploughing or churning through logging activities.

It is quite logical that the typical clear cutting and logging procedure taking place in United States woods will greatly increase the rate of humus oxidation at the same time as the normal production of litter is discontinued. A burning of slash





produces ashes of a high basic reaction which will further accelerate humus oxidation. Seeds of plant species able to thrive on the clear cut areas are present only in negligible amounts and the area may often lie more or less bare for a few years after the clear cut until gradually a new vegetation invades or, as preferred, the area is covered with seedlings. When these gradually close together over the ground, the normal well-balanced natural cycle of forest soil turnover (with a constant litter production, corresponding humus formation and humus oxidation providing a perpetual even flow of soil nutrients) has been broken for a decade or more. Immediately following the clear cut and slash burning a large part of the accumulated humus has been broken down and the released nutrients may have disappeared by leaching or even by evaporation.

When the new stand of young trees has closed together over the impoverished soil the annual nutrient release will be far below what was normal before the clear cut. The young stand may either grow unsatisfactorily or will have to make its roots search for nutrients in the newly-fallen litter in an effort to short-circuit the normal nutrient turnover in the soil.

If therefore, due to a significant slowdown of the normal nutrient release within a couple of decades after a clear cut, the young trees have to short-circuit the normal humus turnover of the soil, it will be at the cost of the most important characteristics of the ideal soil structure. The roots will interweave the layer of newly fallen litter which may assume a fibrous or duff-like consistency. The result is that less durable humus is now formed from the decaying litter. The soil-organic matter of this kind is less mixed with the mineral soil and attracts too large a part of the tree roots, which now to a lesser extent than before will grow into the deeper strata of the soil.

The organic layer may become more acid with pH often going considerably below 4.5; in several cases (at pH 4.5 or below) even a podsol leaching of nutrients from the surface layers may occur. The organic layer will gradually show all signs of nitrogen poverty characterized by a too-high carbon/nitrogen ratio.

Large quantities of debris remaining on the forest floor as a residue from the clear cut are of an ex-

tremely low nitrogen content and may add considerably to an undesirable carbon/nitrogen ratio.

A reasonable explanation of part of this development may be that the roots of the acid-tolerant species (as Douglasfir, pine, spruce and hemlock) by means of their mycorrhiza may be able to extract the nitrogen of the litter while still in the form of lower organic compounds before it is broken down to free ammonia which at once would have been utilized in humus formation.

The obvious tendency of tree roots to become much denser in the organic top layer than in the mineral soil in cases of unsatisfactory soil condition may under certain conditions (strong shade, lack of thinning) become auto-catalytically more pronounced because a lowering of the nitrogen level available to the trees will gradually lead to a more nitrogen-poor litter, which also will automatically be lower in mineral bases; an acid soil begets an acid vegetation and acid litter produces an acid (ammonia-nitrogen-deficient) soil. Under good lowland conditions these tendencies will sooner or later be broken as the stand grows older and more light comes into the stand. But as long as unsatisfactory soil conditions prevail, possibilities for growth are not optimal. The roots spread in a smaller volume of soil and this has a smaller capacity for water retention through the drought period; the abundance of nutrients constantly flowing under ideal soil conditions is not available under these conditions, the soil is nitrogen- and base-starved; the roots are too busy canvassing the decaying litter for nutrients and are therefore unable to draw sufficiently on the mineral reserves produced by the steady weathering in the deeper soil strata. Even the aeration of the soil below the raw humus may be insufficient for the demand of the roots.

Abandoned farmland will generally show a similar development, when planted to or taken over by conifers; when cultivation of exhausted soil is discontinued, generally only the most difficultly oxidizable humus is left in the soil and the tree roots have then to canvass the litter of the new stand from the moment it starts falling to the ground. Exhausted farmland offers no stimulus whatsoever for the roots to seek downwards.

It must be the natural aim of the forester to counteract as soon as possible this tendency to soil deter-

ioration which seems to be a natural consequence of the methods presently in use in regenerating the forests in the U.S. A shelterwood regeneration (leaving part of the mature trees for shade) would to a great extent avoid the bad effects on the soil of the clear cut, but would presumably in many places not be feasible in connection with an economic harvest of virgin stands.

I would like to emphasize the fact that early, frequent, and light selection thinnings are the most natural, fastest, and cheapest means existing for making such deteriorated forest soil regain its full productivity within relatively few years. A decade or two of light, frequent thinnings (preferably annual) in young stands, where especially the larger coarse trees are taken out with sufficient care, will often produce such an improvement of soil condition that the productivity of the soil may increase around one unit (160 cubic feet), and in severe cases of soil deterioration even more.

The following explanations will substantiate this claim:

1) When a young dark stand is thinned, light is brought into it and the increase in temperature as well as in light will speed up the decay of the litter covering the ground—and as nitrogen was short in relation to carbon, only carbon is lost; increased decay of organic matter therefore means reduction of the carbon/nitrogen relation. This in turn means reduced acidity, accelerating further breakdown. Nitrogen is basic below pH ar. 5 but can be acid due to nitrification above pH 5. Carbon may be neutral, but develops normal acidity in decaying (partly oxidized) organic matter; when volatilized through full oxidation it disappears as carbon dioxide (CO<sub>2</sub>) and thereby reduces acidity.

2) As a result of the thinnings, a larger part of the twigs and branches in the stand is brought to the ground and left to decay there through the limbing of the cut stems. This brings benefit to the soil condition in two ways—physically through making the layer of decaying litter more porous, heterogeneous, and thereby better aerated at the same time, as it can stay more moist in dry periods. Decay is speeded up through this effect and the acidity surplus thus reduced as explained above. Twigs and branches also contain the larger part of the ashes present in a tree. Plant ashes are principally basic, the con-

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# FINNISH

## "SAUNA"

### COTTAGE

By AULIS NOPSANEN

It was quite a surprise I experienced when I arrived for the first time at my "sauna" cottage, situated about 10 miles outside Helsinki, early this spring. I wanted a cup of coffee, and since it was a beautiful spring day I decided to cook the coffee in the open brick fireplace I had built outside, close by the cottage. But what did I see? A stone-chatter had built its nest in the fireplace!

"To be sure, you really have found a place for your nest, little bird," I thought, but since the hatching of the eggs seemed to be already in progress, I did not have the heart to chase her out. So I had to wait to use my fireplace until the nestlings were born and had grown up to such a degree that they were able to fly out of the nest, and I had to cook the coffee inside.

One day when I peeped into the fireplace I noticed that the dam was absent, and that there were seven tiny eggs in the nest. A week or so later the eggs had hatched into nestlings, and now both the dam and the male were awfully busy taking food for their little ones—insects, larvae, and worms. The nestlings were still blind, but they seemed to hear all right. As soon as the slightest rattling noise was heard near the nest, all the nestlings simultaneously stretched out their necks, and with their mouths wide open they waited to receive something into them. It is true that only one of them received an insect or a worm at a time,

but each time they were all ready for it, and their appetites seemed to have no end. What I wondered was how the dam and the male knew which one of the nestlings had been fed last.

But the fledglings developed so quickly that you could almost see them grow; when I peeped into the nest a couple of weeks later, it was empty. In the neighboring trees the little ones were making their first attempts to fly.

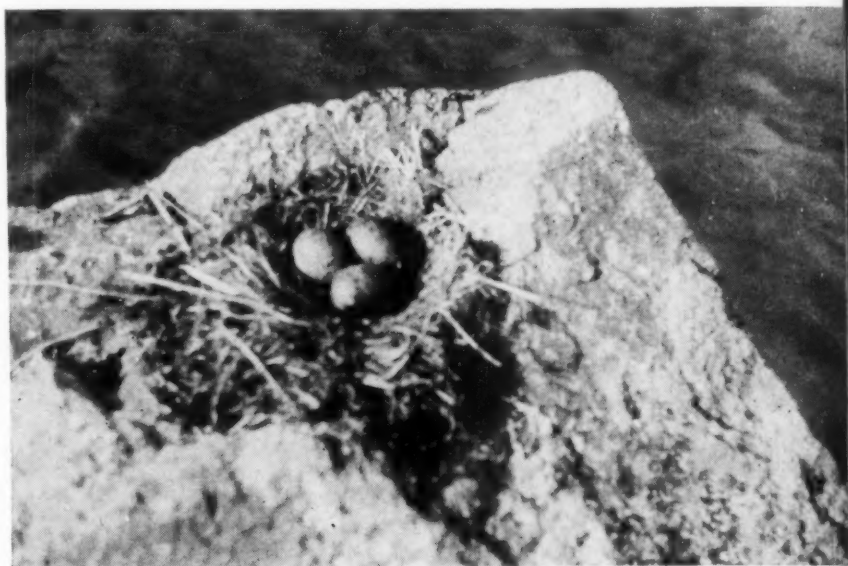
In order that I could use my open fireplace myself, the next spring, I

made a bird-house and hung it up in a nearby tree. Let us see whether I shall get a "tenant" which will pay its rent by singing me every morning a song of praise.

The next day I went to the seashore to wash my hands—it was still too cold to go swimming. But hardly had I reached the shore when two gulls, which had been sitting on a rock, soared screaming up into the air and attacked me like bombers. From the heights they darted down straight towards my face, changing

(Turn to page 81)

On top of the rock was the gulls' nest which had three large eggs in it.



# SEED: SOURCE OF LIFE

By AKE WIKSTEN

A SEED lot usually contains a large number of seeds which, like everything else in plant life, are subject to variation. Due to this variability a seed lot consists of individuals that differ with respect to a number of details and characteristics, some of which may concern features of vital importance such as the development of embryo and endosperm. The frequency of seeds in various classes of embryo and endosperm development directly determines the germinability and thus the quality of a seed lot. A large proportion of well-developed seeds in this respect is characteristic of good seed material.

Good information on the quality of seed is a prerequisite for a rational and economic use of the material. In forestry such information is generally procured by elaborate methods of testing which often require rather long periods of observation

to be of real value. Slowness of procedure and difficulties in studying the effect of various kinds of treatment on individual seeds in various stages of development made another approach to tree seed testing increasingly necessary.

In 1953 a new method of seed testing was reported by A. Gustafsson-M. Simak et al. at the department of genetics at the Swedish Forest Research Institute. The method is based on the utilization of X-ray techniques, and it has subsequently been improved to become quick and dependable.

*Procedure*—First a representative sample of the seed lot is placed in a perforated cardboard pattern. An X-ray picture is obtained by exposing the seeds to a light dose of soft X-rays. The X-ray unit used is displayed in fig. 1, which also shows a seed sample (4 x 50 seeds) placed on the plate. During exposure the

stage is enclosed by a lead screen.

On the X-ray picture it is possible to discern the interior development of each individual seed in the sample. Various degrees of endosperm and embryo development then are recognized, and the number of seeds belonging to each class is recorded. A seed in:

Embryo class 0 has no embryo or endosperm

Embryo Class I has endosperm but no embryo

Embryo class II has one or several small embryos, none exceeding 50 per cent of the embryo cavity

Embryo class III has one embryo with a length of 50-75 per cent of the embryo cavity

Embryo class IV has one embryo with a length exceeding 75 per cent of the embryo cavity.

Seeds belonging to endosperm class A have well-developed endo-



FIGURE 1. X-ray unit used. A sample (4 x 50 seeds) is placed on plate beneath tube. During exposure the stage is enclosed by lead screen.

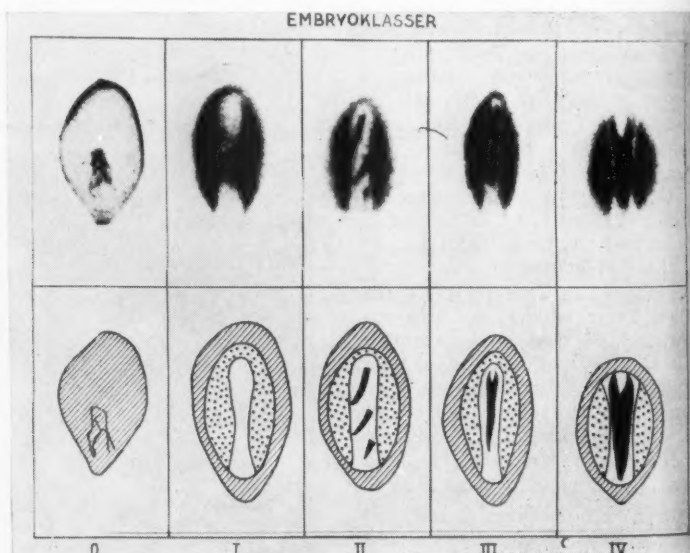


FIGURE 2. Embryo classes.

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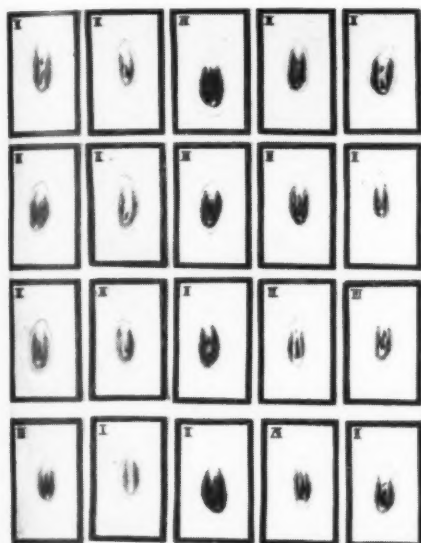
ESTS





### Turkey

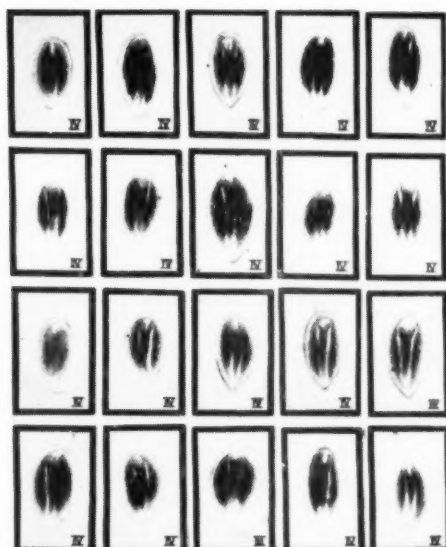
Lat. 37°N Elev. 5000 feet Southern  
limit of Scotch pine occurrence



Endosperm A			
Embryo class	Seed frequency per cent	Reduction factor	Germinability per cent
O	—	0.0	0
I	—	0.0	0
II	—	0.50	0
III	5	0.88	4
IV	95	0.99	94
Calculated germinability			98

### Lapland (Sweden)

Lat. 68°N Elev. 1050 feet Northern  
limit of Scotch pine occurrence



Endosperm B			
Embryo class	Seed frequency per cent	Reduction factor	Germinability per cent
O	—	0.0	0
I	5	0.0	0
II	55	0.5	3
III	30	0.43	13
IV	10	0.68	7
Calculated germinability			23

FIGURE 3. X-ray pictures of Scotch pine seed.

### INSECT DAMAGES

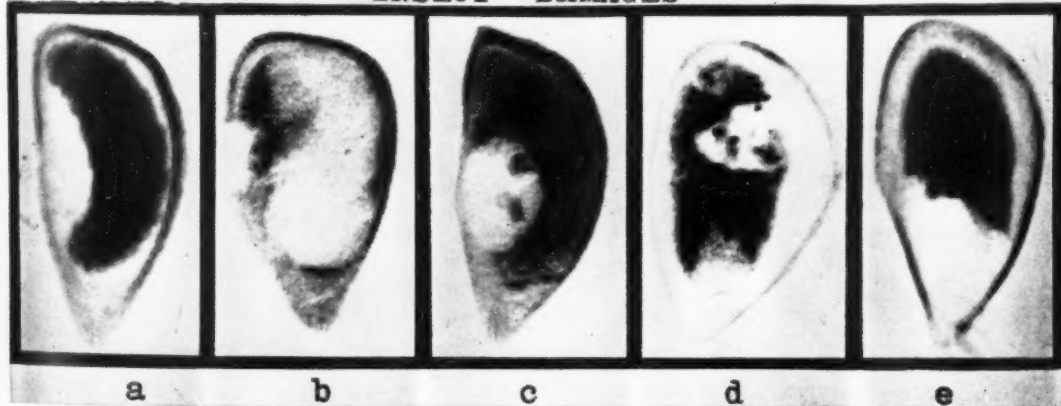


FIGURE 4. Various types of damages caused by insects. A larva is visible in a.

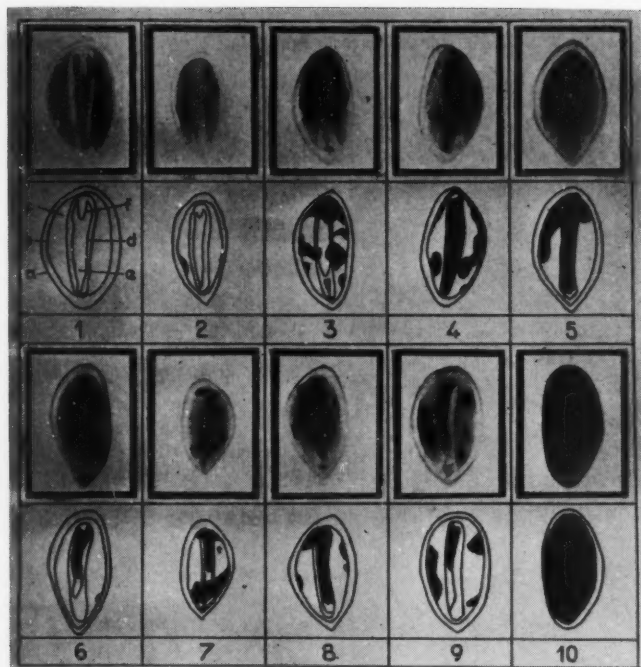


FIGURE 5. X-ray pictures of seeds soaked in barium chloride solution.

- 1—fresh undamaged seed
- 2—seed damaged by an insect (dark spot)
- 3-9—various degrees of physiologically imperfect seeds
- 10—very low vitality (or dead) seed
- a—seed coat. b—cavity. c—endosperm. d—embryo cavity. e—embryo. f—cotyledons.

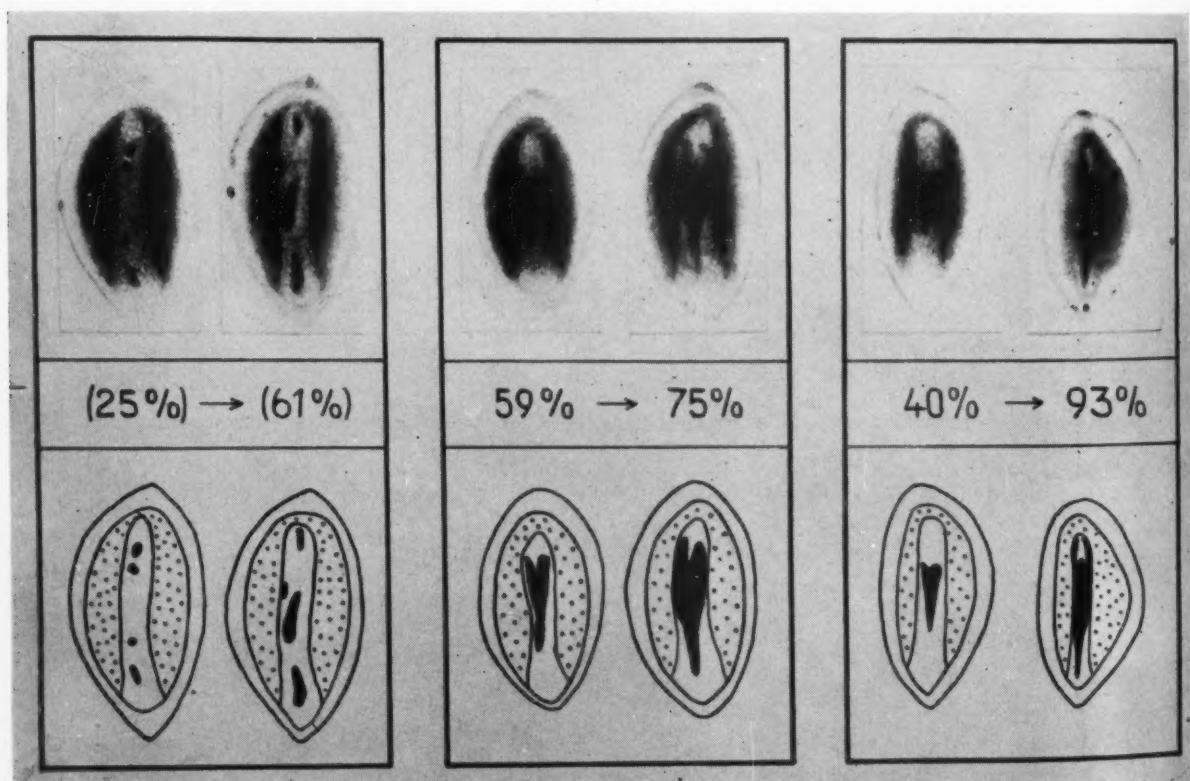


FIGURE 6. X-ray pictures of poorly developed seeds improved by stratification. Seed in embryo class II (25 per cent germinability) has been advanced to embryo class III. Seeds in embryo class III (59 per cent and 40 per cent) have been advanced to embryo class IV (75 and 93 per cent, respectively).

TABLE I

Endosperm A			Endosperm B		
	Scotch pine	Norway spruce	Scotch pine	Norway spruce	
Embryo class 0	No germination		No germination		
Embryo class I	No germination		No germination		
Embryo class II	50	36	5	15	
Embryo class III	88	82	43	71	
Embryo class IV	99	97	68	92	

development of endosperm and embryo in the first seed lot is superior to that of the Swedish seed lot. This is a result of more favourable climate in Turkey. The Roman figures present the embryo class of each seed.

The X-ray technique lends itself excellently also for an investigation of mechanical defects in seed. Figure 4 is an X-ray of seeds that have been damaged by insects (4a also shows the larva).

Further improvement of the method is obtained by soaking the seed in a solution of barium chloride before the exposure. This provides a method of distinguishing fresh seed from old seed in addition to showing various other defects more clearly.

Since old seeds or necrotic areas of the endosperm surface have lost their natural semipermeability, heavy kations will be able to penetrate into the interior of the seed. Figure 5 shows various degrees of physiological defects. Fig. 5:1 represents an entirely sound and fresh seed and Figure 5:10 a seed of very low vitality.

Only seeds with an impregnation of less than 1/4 of the endosperm surface are germinable according to the computation technique described above. The dark patches delineate dead tissue from live. This limit of 1/4 still needs further investigations.

Since the exposure of seed to X-rays has been found to have no effect on the viability of the seeds at these very low rates, it is possible by this method to follow the development of the same seeds all through the procedure of a certain treatment. This provides excellent opportunities to develop and check methods of practical seed improvement.

Figure 6 shows examples of this. What happens as a result of stratification? Figure 6 shows the effect on poorly developed seed. The germinability of seeds in embryo class II has been raised from 25 per cent to 61 per cent by rationally-studied forms of stratification. Seeds in embryo class III have been advanced to embryo class IV. A close study of

X-ray pictures reveals that stratification actually means a growth of embryo and endosperm.

Whereas the old tree seed testing methods normally require 14-30 days or more to give good information, this new method with X-ray technique is rapidly providing comprehensive and dependable knowledge of the status of the seed within 2 hours. Several seed dealers are planning to equip themselves with X-ray facilities. Seed research, too, will be greatly promoted by the possibility of studying the behavior of more homogenous populations.

## ABOUT OUR AUTHORS

**Dr. Richard Plochmann** (*The Struggle for Mixed Forests*) is with the Bavarian Forest Service and is a member of the southern school of German forestry thought which tends to stress "working in harmony with nature" in contrast with the northern school, which believes there are times when you have to force nature to some extent. **Lauri Hemmi** (*Finnish Forest School for Farmers*) spent a year at Oregon State College getting his master's degree in forestry and is now with the Finland Forest Service. **Flemming Juncker** (*Foresters: Look to the Soil!*) is a disciple of the German school of thought and practices intensive forestry on his 2,000-acre tree farm in Havndal, where soils are cold compared to American forests. **N. A. Wiksten** (*Seed: Source of Life*) is the director of the Swedish Forest Research Institute at Stockholm and has spent some time with Weyerhaeuser Forest Research in America. **Aulis Nopsanen** (*Finnish "Sauna" Cottage*) is the sub-editor of the *Helsingin Sonomat* and a contributor to many foreign publications. **Dr. Wilson Compton** (*Forestry Under a Free Enterprise System*), AFA board member, is former secretary of the National Lumber Manufacturers Association, former president of Washington State College, and former director of the Voice of America. **Edwin F. Heacox** (*Modern Johnny Appleseed*) is vice president of the Timberland Division of the Weyerhaeuser Company. **James Anderson** (*Norway: Woodlots at Work*), recently with American Forest Products Industries, studied Norwegian forestry at first hand on a Fulbright scholarship. **Dr. N. T. Mirov** (*A Strange Forest Tale*) is plant physiologist for the Pacific Southwest Forest and Range Experiment Station in California. **Frank Heyward** (*Future Possibilities and Limitations of the South's Wood Using Industries*) is with the Crown-Zellerbach Corporation at Bogalusa, Louisiana, and is an expert on southern forestry. **Donald A. Williams** (*Hugh H. Bennett*), administrator of the Soil Conservation Service, is from the Great Plains and was one of the soil scientists closest to the late Dr. Bennett. **Tom Gill** (*Editorial—The Fifth World Forestry Congress*), an internationally known forester, is the executive director of the Pack Forestry Foundation. He is one of a small band of 50 Americans who have taken the forest conservation story to many countries since World War II. **Albert G. Hall** (*Washington Look-out*) is a consulting forester whose headquarters are in Washington, D. C. **Monroe Bush** (*Reading About Resources*) works for the Old Dominion Foundation, a philanthropic organization.

The man responsible for securing the foreign articles for this issue of AMERICAN FORESTS is AFA Vice President **Edward P. Stamm**. On a trip through Europe, Russia, and Scandinavia last year, Mr. Stamm contacted these distinguished foresters and requested that they submit articles for this special Fifth World Forestry Congress issue. Mr. Stamm is a forestry consultant and a former vice president of the Crown-Zellerbach Corporation.

# FINNISH FOREST SCHOOL FOR FARMERS

By LAURI HEMMI  
and EERO PAATERO

Students are studying management problems of a 15-year-old stand of spruce.



Students examine a 30-year-old stand of birch that's been thinned 4 times at 5-year intervals.

FARM forests comprise the most important part of Finland's forests. Why? They provide more than four-fifths of all wood produced by Finnish forests.

The profitability of farm economy depends decisively on the yield of those forests. But also largely dependent upon them is the welfare of the whole nation. Finland's major export consists of wood and wood products.

The rational improvement work on farm forestry is headed by Forest Boards, which are formed by trustees of farmers in each province. Forest Boards have several foresters doing this work. In each community there

AMERICAN FORESTS



is, in addition to this, a local association with some foresters.

North Savo's province in middle-east Finland may be mentioned as an example of a typical Forest Board. There are 2.5 million acres of farm forests on the area, and the Forest Board has nine forest officers and 20 foresters. The local forest associations have 50 foresters. According to the Forest Law, the Board sees to it that no forest destruction occurs. Professional foresters do this work and give help in marking trees for thinnings, regenerations, logging plans, marketing problems, etc.

The best result is believed to be obtained only by getting all the forest owners as active forest producers. By this means the Forest Board of North Savo has done in its 30 years of existence very intensive educational work, of which a couple of examples may be mentioned.

The Forest Board has owned for 20 years an average-sized demonstration farm, on which 2-3000 farmers become familiar with forest management questions each year. The School of Forestry for Farmers was built near the farm in 1953. As this type of forestry school for farmers is already found in several provinces of Finland and more are in sight, a nearer survey of the school is probably appropriate.

The School of Forestry for Farmers forms an important part of the activities of the Forest Board; the purpose of the school is to give the farmers such good knowledge and skills that they could manage most work on their forests independently. Teaching is done mainly in connection with practical training work. Silvicultural questions are solved mostly in summer time and logging problems in winter.

There are two main courses held each year. The first one starts in March and ends in August. As the students get two holidays in spring and summer during the busiest time for their farm work, this course suits young farmers quite well. The second course is held in the fall and, like the first course, for four months. Both courses include Forest Management and Logging Engineering.

For those farmers who cannot take part in the courses mentioned above, a short one and a half months' course is held. In addition to this there are in the curriculum of the school several short training meetings for young farmers and foremen. The length of this kind of



Since most farmers do the logging of their forests themselves this subject is covered intensively at the school. Even some of the farmers' wives participate in the course.

School of Farm Forestry is located at Toivala, Finland. On the forest owned by the school are several experimental plots where students receive on-the-spot instruction.



meeting varies from one day to two weeks. The topics may be actual questions on forest policy in the province, game management, motor saws, tractors, etc.

It will be particularly pointed out that each year are held professional training courses to keep and add to the skill and working standards in professional work on farm forestry.

But let's go back to the main task of the school—how the farmers are taught in the four-month main courses.

To reach the highest possible efficiency of instruction, a maximum of 30 students are taken in each course. It is thus possible to organize the

practical training works suitably with a relatively small staff, which consists of two forest officers and one forester. And as was mentioned, the practical training works have an important position among the course programs. Theory is not underestimated, but it is agreed that theoretic instruction given in connection with practical training works is most effective—knowledge is added to besides skill, and at the same time the main purpose is reached: the farmers learn to do different types of work on their forests independently. The hammering of information into students' heads is kept secondary—in

(Turn to page 60)

# FORESTRY IN

## Forestry Under A

ANY informed person who undertakes to appraise the progress of American forestry under free enterprise should pay his respects to the collective common sense, the informed judgment, and the fair-mindedness shown by The American Forestry Association over nearly 85 years of forest conservation history. Its contribution is too-little known to the public, too-little understood by the forest industries, and too-little appreciated by the forestry profession itself. This association of interested citizens, with no interest except the public interest, has probably exerted a greater influence over a longer period of time on the march of forest conservation in the United States than any other group. For decades, often charged with vigorous controversy, it has been a weighty balance wheel in the development of forest policy, and an open advocate that has served as a steadying bridge between the forces, often conflicting, which have shaped forestry policy in America.

Founded in 1875 on an appeal to conservative idealism, The American Forestry Association was the first tangible and enduring outgrowth of a growing awareness on the part of the informed public that our renewable natural resources were not necessarily inexhaustible and that forest use should be accompanied by forest restoration. In charting its initial course the AFA sought to halt indiscriminate forest destruction in America, promote forest protection, and encourage permanent productive use of forest lands. In general terms, these are still its goals.

Dr. Compton, AFA board member and chairman of the Cameron Machine Company, was formerly general manager of National Lumber Manufacturers Association and president of the Washington State University.

# IN THE UNITED STATES

## **A Free Enterprise System** By WILSON COMPTON

For a long time, the association was a lone voice crying in the wilderness. While it was a rallying post for educators and other learned individuals—"eggheads," to use the modern colloquialism—the public at large and many of the groups most directly concerned were apathetic. Had there not always been enough of everything? Why was there reason to doubt that it would ever be otherwise? Certainly, for a number of reasons, the forest industry of that period was not prepared to practice forest conservation. The most important reason was that it simply would not pay to do so with so much virgin timber still available in what was still a pioneering era imbued with pioneer boldness and, in some ways, with pioneer recklessness.

To make progress toward its goal, the association therefore took the one course of constructive action then open to it by spearheading a campaign to set aside substantial public reserves of timberland which would serve as a bulwark for the future and would be a symbol and a visible reminder of the importance of protecting forestlands from all forms of devastation, particularly fire. In an important sense this movement was the origin of today's vast system of national forests and national parks.

This might be interpreted to mean that the early idealism of the association was one step ahead of the inexorable laws of supply and demand. In a sense that is true; certainly sound forestry as we know it today was not economically feasible in 1875 and for a long time

thereafter. But to my mind, a more significant interpretation is that the association, in spearheading the establishment of the national forest reserves, provided the first bridge between the old ideas of reliance on "inexhaustible" timber supplies and the new ideas of forests as a resource to be protected, managed, improved, and maintained in continuing productivity, and set the stage for the development of forestry by a trained forestry profession when the need for such services had established firm economic foundations. But the bridge was long, and the road across it was hard.

For a number of years the association showed spurts of activity and then languished. But there was no break in the continuity of its effort. It was not until the turn of the century that the era of Gifford Pinchot and Theodore Roosevelt set the stage for concerted action. When the association called the Forest Congress of 1905, the public was more receptive. With Roosevelt himself sparking this important convention, the Congress became the catalytic agent directly responsible for the setting aside of millions of acres of timberland which were to become the back-bone of our national forests. So the first great goal of the association was substantially realized.

This action, however, was not the result of the convictions of a strong United States Congress, but the result of the determination of a strong chief executive. A few congressmen of the period were deeply interested. Many were indifferent. Some were hostile. These diverse attitudes re-

flected the sentiments of their various constituencies. Especially in the western states, timbermen and other interests concerned with public land policies were fearful that The American Forestry Association and its friends were embarking on a vast socialistic experiment which they considered inimical to freedom of enterprise in the purchase, development, and use of public lands.

Such a course of action, as a matter of fact, could easily have been followed except for one important fact. From Bernard E. Fernow, Pinchot, and Roosevelt on down the line, the leaders of the young national forest movement stressed that conservation meant the "wise use" of resources and not the locking up of resources.

Gifford Pinchot may have done harm by his incessant criticism of "timber barons," his violent attacks on what he called "forest devastation," and his often reckless and dire predictions of "imminent" timber famine. But he did much greater good. He, more than any of his contemporaries, aroused public interest in forest conservation. He got people to *think*—a notable achievement—and while he made few converts to his program of forestry by legislative fiat, he made thousands of admirers with his tenacity, the vigor of his spokesmanship for things in which he believed, and the zeal of his public service.

I know. Forty years ago, as a youthful executive officer of the lumber industry's national association, I occasionally crossed words with him. He sometimes called me  
(Turn to page 50)



# THIS IS A

By DEAN ALFANGE

*WHAT does America mean to me? America is not just rich in material things, an industrial giant, a mighty military power. America is the country schoolhouse, the village church, the town meeting, the humble farmhouse, the rhythmic poetry of peaceful countryside . . .*

America has big rivers . . .



OUR PRESIDENT — DWIGHT D. EISENHOWER: Decent, honest, and internationally respected. Power has not corrupted this beloved man



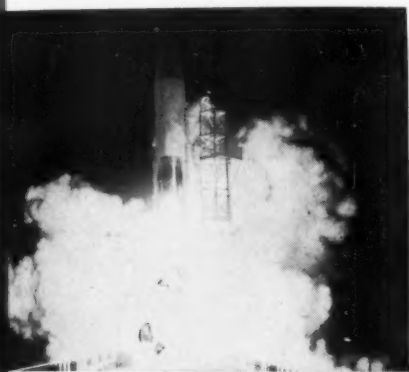


Thoroughbred Holsteins graze  
on milkshed in Washington  
County, State of New York

A town meeting in a country  
store in Maryland. This, and  
many more, are seats of  
power in America's decisions

# AMERICA

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hook-  
town  
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ceful



ATLAS intercontinental ballistic missile  
leaves launching pad at Cape Canaveral



Some people abroad have called our political conventions "orgies" but they are  
*orderly* orgies and we like them. These conventions nominate our national leaders

... mighty cities. Neither are as clean as they should be but America has been so busy growing it has not had time to clean up.



*America is the mirth and laughter of its children,  
the charity, the generosity, the compassion of its  
people. America is the triumph of merit and diligence  
over family and caste. America is the freedom of choice  
which God intended all men to have—the right  
to do, to speak, to worship, to dissent, to dream,  
to build, to fail and to succeed . . .*



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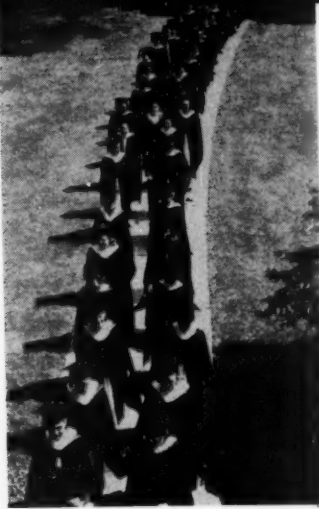
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1—Workshop for peace. The permanent home of the United Nations in New York, built of marble and glass, has 39 stories

2—Peace with justice is the prayer at every American dinner table, in every American home, in each of 50 states in union

3—As in many other fields, Negroes have become standouts in professional baseball. One is Hank Aaron, Milwaukee Braves

4—But spectator sports aren't enough for Americans. Trail riding into wilderness areas as sponsored by AFA is popular

5—Americans love music whether it be mountaineer ballads,

rock-and-roll, or opera. Here is opening night at The Met

6—When Americans are well-off they have bigger families. As a result nation's schools are literally bursting at the seams

7—To meet mounting school needs, Parent-Teacher Associations, educators, and legislators are planning massive programs

8—These goals will be met, as Americans know their greatest resources are trained men and women from American colleges

9—Liberty, symbolized by Liberty Bell, largely depends on type of training received by children in homes, schools, churches

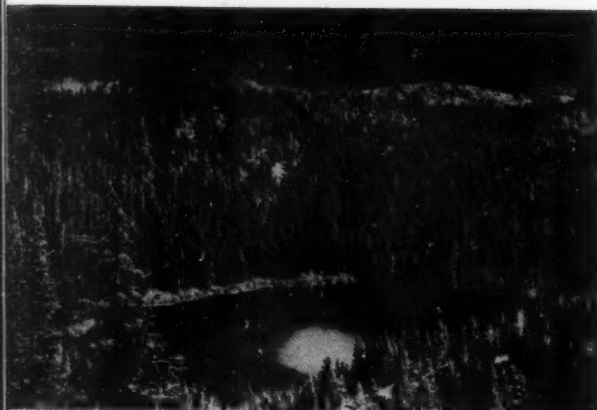




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*America is the marriage of liberty with authority, of individual freedom with social organization. America is the best discovery yet of a full and honorable way of life . . .*

5



1—America is a productive land blessed with rich fields and forests. Under "wise use," it is managing, not mining them

2—While much farming in America is mechanized, sight of a pair of handsome bays still brings gleam to most farmers' eyes

3—Gifford Pinchot National Forest, Washington, is one of 151 federally owned and managed forests, totaling 181 million acres

4—Meat for the nation's table. Cattle and sheep from western grazing lands in pens at the Union Stock Yards in Chicago

5—A federal and a private forester—two of 17,000 in America—talk situation over on Osceola National Forest, Florida

6—A wealth of resources under the earth also contribute to America's well-being. Steel from open hearth is being tapped

7—Wheat to feed the nation. Farmers say if nation's leaders were as smart as they are America could feed much of world

8—Most valuable resource of all in America is water, and it is rapidly becoming more so. This is Tumalo Falls near Bend, Ore.





6

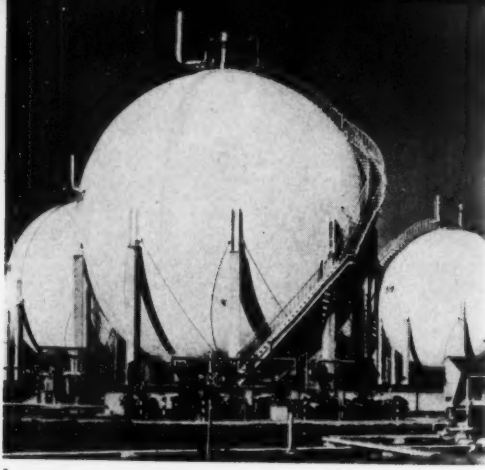


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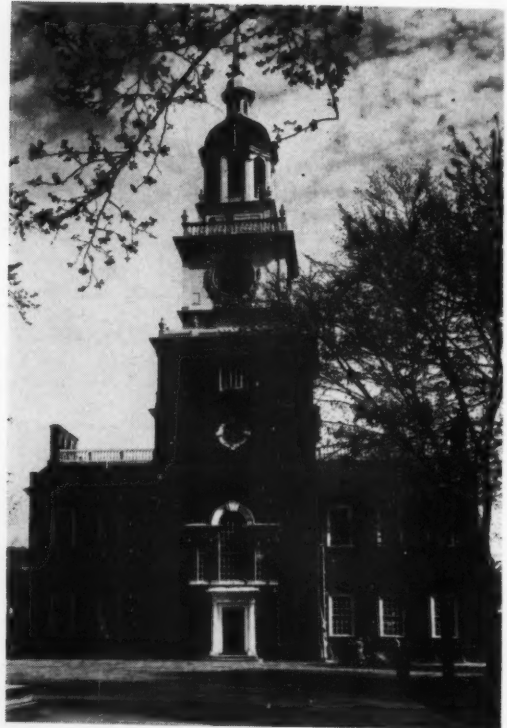
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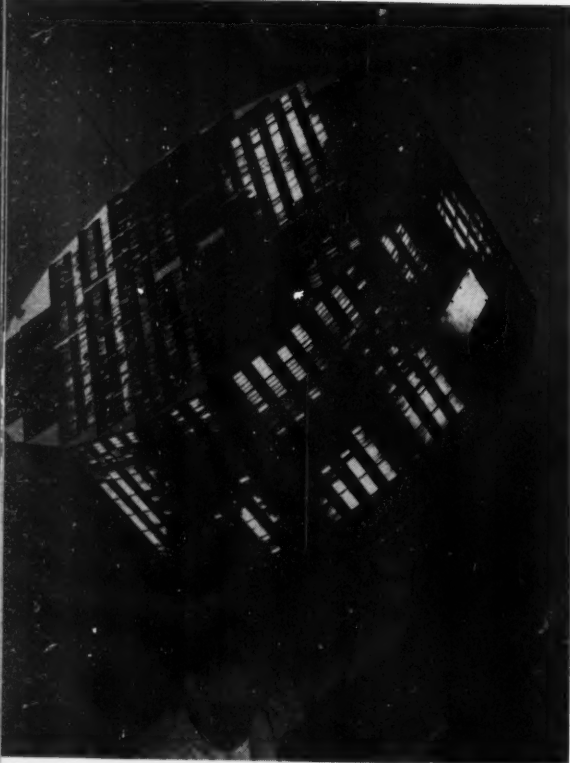
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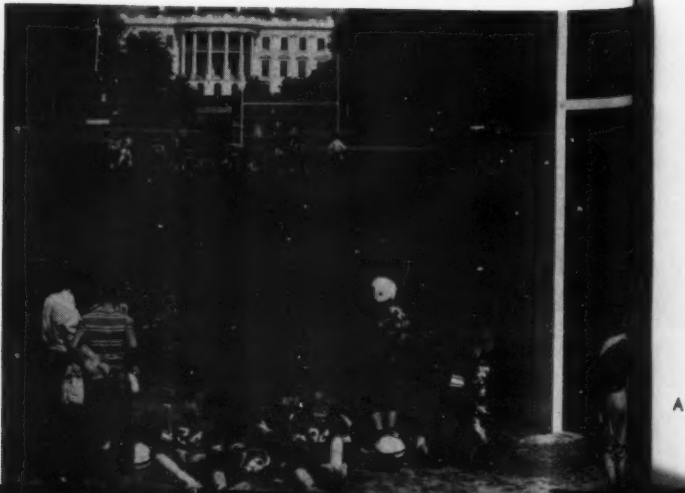
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1—Oil, another valuable resource, is stored at the Baton Rouge Refinery in Louisiana

2—Another "resource" is preserved. Virginia school girl receives trial polio vaccine

3—America does not intend to be left behind in the space race. This is a Tiros satellite

4—This is the birthplace of American freedom—Independence Hall, Philadelphia—where the founding fathers of this country signed the Declaration of Independence

5—The President's job is often a lonely one, and on occasion "Ike" and his predecessors have watched these football matches from windows of the White House, in the distance

6—President Eisenhower is one of the most famous graduates from this "long gray line"—Corps of Cadets at U.S. Military Academy

7—Research has flowered in the United States in the last 50 years. This is Haskell Laboratory where chemical research is carried on in preventive medicine, public health

8—Americans are living longer today thanks to modern research, and plans are now being made to provide for their further comfort by giving retired people more economic security

9—America is a big and friendly country, and modern transportation has made it easy to cover most of it quickly and easily. *American Forests* hopes our visiting foresters will see much of it on their visit to our shores and that when they fly homeward they will remember us with warmth and admiration as we will certainly remember them



9

*We are rich in all the things that decent people yearn for. It is our task to live up to these values and to make them known to every nation, friend or foe. For on us has fallen the challenge to lead the free. And the truth about ourselves is more powerful than any man-made missile.*

MODERN

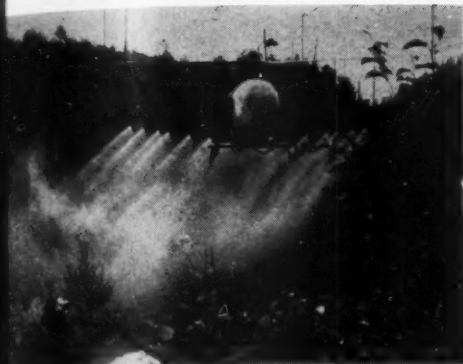
JOHNNY

APPLESEED



Wo  
ters





Working at all altitudes in the Northwest, 'copters made real "break-through" in tree farming.



Two Douglasfir seeds happened to land a few inches apart on the bare soil.



Seed is inspected before shutting cover of 'copter's port seed bin.

### Special to AMERICAN FORESTS

—Looking like cyclops-eyed dragonflies, helicopters are being called upon by modern-day foresters to aid in the intensive campaign to perpetuate our forests. These unique flying machines are making it possible for foresters to write one more successful chapter in the story of scientific forest management. In truth, this modern version of Johnny Appleseed has gone airborne.

Weyerhaeuser Company, for example, in one month completed seeding over 17,000 acres of logged-over land in 75 flying hours with helicopters. Even Paul Bunyan, mythical giant of the pioneer days of logging, would have had difficulty accomplishing this mammoth-sized job.

Working with Northwest charter helicopter operators, Weyerhaeuser began experiments 10 years ago that have led to successful aerial seeding and to the control of weed trees and brush through aerial spraying.

The helicopter now is an accepted tool of forest managers. Many recent advancements in science and engineering have made reforestation work more successful, and in the forefront is the helicopter, which has paved the way for successful aerial seeding.

An editor once described helicopter pilots as sky-bound jockeys dodging steep canyon walls and jagged mountain peaks much like Texas cowboys dodging sagebrush when roping steers. Operating at a speed

### By EDWIN F. HEACOX

*Vice President, Timberland Division  
Weyerhaeuser Company*

of 45 to 60 miles per hour, the helicopter seldom flies higher than 200 feet above the ground on seeding operations. The high degree of maneuverability at slow speeds readily adapts the helicopter to the mountain ridges and craggy canyons of the Douglasfir region. Quick about-faces and the ability to hang almost motionless in the air are characteristics that make the helicopter resemble a huge dragon-fly.

To each side of the helicopter's bulbous eye is a 200-pound capacity seed hopper. Just below each hopper is a power-driven metering device for controlling the rate of seed flow. Air tubes from the outlet of the meter lead to a center-mounted, flat, hollow disk, called a slinger, which is driven from the engine shaft. The slinger rotates in flight, distributing seeds in a 75-foot swath.

The seed hoppers are loaded evenly to maintain balance while the 'copter is flying. While in flight the pilot has hooked to his ear a device which transmits the vibrations of the seeds leaving the slinger. This device is the pilot's warning, signalling the end of the seed in the tanks. No gas-tank type of gauge has yet been devised.

Seeds are planted at the same elevation and under similar climatic conditions to parent trees. Therefore,

helicopters are loaded with seed which has been collected from only one 500-foot elevation level. They must return to the ground for a new seed supply when an area at a different elevation is to be seeded.

Seed is generally scattered at the rate of one pound to the acre. With over 40,000 seeds to the pound, an area one mile square receives over 25,000,000 seeds. Seeds are sown in a cross-flight pattern which requires flying the area twice, with the second flight at approximately right angles to the first when rugged terrain permits. This method provides a more even distribution of seed. When flying in a cross-flight pattern, an acre of ground can be aerially seeded in about 15 seconds.

Successful aerial seeding has faced many obstacles. Primary among these has been the loss of seeds to rodents. In addition, satisfactory seeding of forest land has been dependent upon an adequate seed supply, favorable seed beds, and control of competing brush, browsing animals, insects, and disease.

Many advances made possible by forest management research paved the way for successful aerial seeding. Most significant has been the development of rodent controls. In the past, direct seeding has proven to be a waste of seed because mice ate most of the seed. These rodents find forest tree seed one of their favorite foods, and when available, tree seed becomes their principal diet. Forest  
(Turn to page 65)

# NOR

By JAMES ANDERSON

Norway spruce are developing under a well-managed stand of young Scotch pine. Light cuttings at frequent intervals maintain conditions for optimum growth.



# W O O L



NORWAY'S forests, important to Norwegians since the days of Erik the Red, are now of critical importance to the entire national economy. One-third of the total of this trade-dependent nation's exports are forest products. A fundamental consideration in Norwegian forest policy is to increase the nation's forest resource productivity while maintaining or increasing the level of forest product exports.

□ We hear much about governmental forest regulation in European countries. Norway is no exception. Laws regulating the output of forest industries, and some related to the field of forest reproduction, are sprinkled through historical records

AMERICAN FORESTS

# WAY:

## LOTS AT WORK



Block cutting is a hallmark of the Norwegian forest landscape. The regeneration in the foreground and seed trees in the center are unusually large blocks. Block cutting can be observed on areas of less than five acres. This scene is near Stai in south-central Norway.

for several hundred years back. But most of these laws were ineffective, especially where they implied, encouraged, or directed out-of-pocket investments by forest owners.

Successful governmental influence on forest production is a most recent occurrence, and success has been achieved only by combining legislative directive with incentive factors. The authors of recent Norwegian forest policy seem to have been fully aware of the significance of this concept when, in 1932, the Norwegian Forest Protection Act was passed by the Parliament. In the several amendments to this basic policy document, increased attention was given to the promotion of condi-

tions which would permit the attainment of better levels of management by forest owners.

While the 1932 law contained provision for effective governmental regulation of cutting practices, a unique provision for financing silvicultural operations probably will assure it of a place of prominence in forestry history.

One per cent of the gross proceeds from timber offered for sale or conversion was withheld from the owner and deposited in his account by the local Forest Service establishment. This was called a "cultural levy." These funds were to be used for specified cultural operations, but could not be considered as a tax

since they were never to revert to the national treasury. This levy was later increased to two per cent.

### Improved Forest Practice

Beginning in 1932, three main ingredients contributed toward an advance in the levels of forest practices on private ownerships—plus some side effects from anti-depression measures.

First, with the establishment of administrative machinery, the regulatory aspects of the new law began to exert their influence. In this respect, it is important to note the philosophy of the administrative agency. The Norwegian Forest Service is guided by the concept of "free-

dom with responsibility," whereby the owner's right to manage his own land is unimpaired as long as the management level meets minimum standards. This agency considers its job to be one of owner-education rather than compulsion. But while the police powers authorized under the law are seldom imposed, their existence undoubtedly adds efficiency to the education process.

Second, the use of cultural funds led to the establishment of good field examples of sound forest management practices and aided in the spread of information about them.

The third ingredient, rising timber prices, undoubtedly has had a major effect upon the attitudes of forest owners. Actually, while the exact contribution of rising prices to better forest management defies measurement, the "apparent" increase is believed to be the most important factor. Apparently, prices increased eight-fold between 1930 and 1956; when calculations are made in hard currency, however, the increase in units was from 1 to 1.8—less than double.

#### Forest Investment Fund

Before the war, private-owner forestry in Norway was making progress—but not nearly fast enough to suit

most Norwegian foresters. It remained for a surprise, almost-accidental post-war development to really get the ball rolling. After the war, the government imposed rigid price controls upon the Norwegian economy. Forest owners complained of unjust treatment, and, largely by instigation of the larger owners and forest industries, a compromise with the government was effected. An advance in price was permitted provided that the increase would be set aside in an "investment fund."

Once the precedent was set, and after considerable grousing, the forest owners became accustomed to the new procedure. The investment fund was placed under Forest Service administration. This money could be used by the owners for a wider variety of activities than was the case with the cultural funds.

A key provision of the investment fund was that money could be taken from it to pay for the management planning services of foresters. Also, tax incentives and a widespread belief that one of the best hedges against inflation is forest investment have led to public acceptance or tolerance of these high levies.

Last year, Norwegian forest owners were required to deposit twelve per cent of their total proceeds from

timber sales into those funds—this amounts to almost one-third of net proceeds on an average operation.

#### Forest Owners Association

Under Labor Party administration, Norway operates under a strictly controlled "planned economy." One of the organizations which generally supports this party's philosophy in the interests of its own membership is the Forest Owners Association, a "co-op" which originally supplied only marketing assistance to forest owners.

While the Forest Owners Association has been active in efforts to subdivide large ownerships to the advantage of smaller property-owners and similar economic-leveling legislation, it is a strong advocate of private ownership. This perhaps makes less surprising a recent development.

Government dissatisfaction with forestry progress on small, private ownerships resulted, in 1950, in the formation of a study group which was to make recommendations on forest policy changes to the Parliament. Faced with the problem of raising productivity and management-practice levels on these ownerships, this group saw two alterna-

*(Turn to page 76)*

logs, mostly peeled Scotch pine pulpwood, are ready for the spring drive. More than two thirds of log transport is still by river driving.







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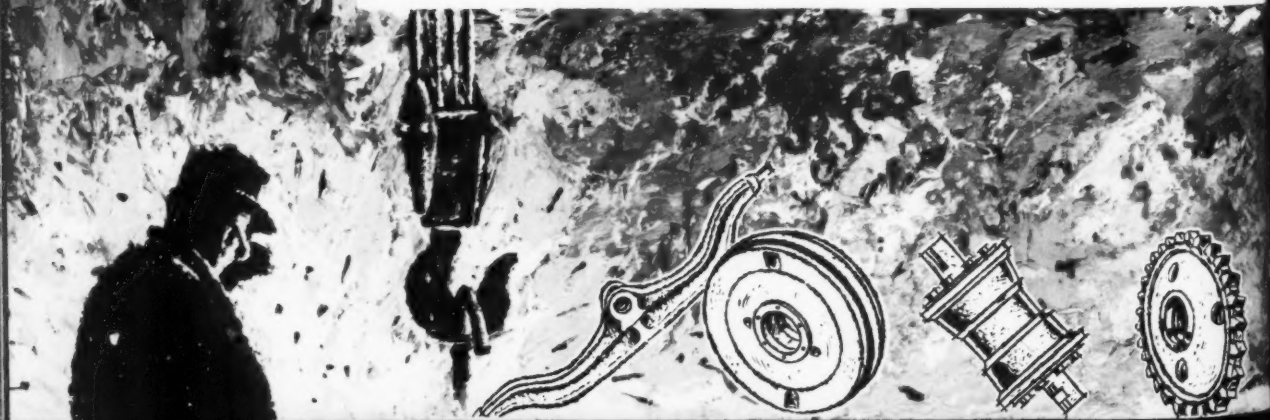
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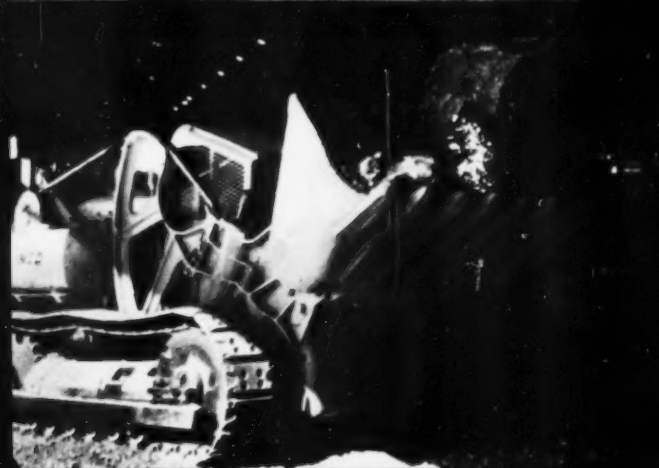
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# Future Possibilities and Limitations of the South's Wood Using Industries

By FRANK HEYWARD

WITHIN the confines of Dixie appears 40 per cent of the nation's continental commercial forest land. The 12 southern states contain the largest body of rapidly-growing softwood forests on the face of the earth. More than half the nation's softwood growth potential is in the South—nearly one-third of the entire world's potential this side of the Iron Curtain. The South's forests annually produce approximately one-third of the nation's lumber, nearly 60 per cent of its pulpwood, all its turpentine and rosin, and vast quantities of other forest products such as poles, piling, cross ties, veneer stock, cooperage, and fuel wood.

Forestry in the South, slow to start, gathered momentum for about 40 years and is now progressing at an amazing rate. The future has never looked brighter. We have the forest area, an expanding industry, natural conditions favoring tree growth, and increasing public interest in tree farming. All that we need do is keep these conditions in balance.

Let us begin our analysis of the South's forests the way most businessmen do, namely by a consideration of inventory and markets. Currently, pine growth in cords exceeds total use by a healthy 20 to 25 per cent. This condition is the reverse of that which existed as recently as 15 years ago, when timber use exceeded growth. This encouraging change for the better should be credited to the hard work of selling forestry to the public on the part of all forestry groups, to the great progress in fire prevention spearheaded by the state forestry organizations, and to an enlightened wood-using industry which not only pro-

vided a market for wood products but which aggressively helped educate timber growers as to proper harvesting methods.

If, at present, we are growing more wood than we are using, what may we expect in the future, for example by the year 2000? Professional opinion of foresters regarding this subject varies. One school of thought is oversupply. The majority, however, believe that industry will expand in proportion to the increased quantity of wood, thereby assuring a constant demand for forest products.

In a study by the U.S. Forest Service of future wood requirements involving low, medium, and high population increases, data based on a medium increase indicated twice the lumber consumption and three times the pulpwood consumption by 2000.

If you have any doubt as to the necessity of looking as far ahead as the year 2000, you need only remember that on the average, a tree planted today will scarcely be large enough for sawlogs in 40 years. On the average, pine trees attain pulpwood size at about 18 to 20 years and sawlog size at about 45 or 50. By sawlog size I mean trees 16 to 18 inches in diameter.

Of course, one factor alone could change the relative importance of our wood supply. This is the extent to which wood is utilized in our future civilization. Obviously, if we stop using wood there will be no demand for it. This prompts a brief review of the per capita consumption of industrial wood. In 1900 it was 116 cubic feet. By 1935 it had decreased to 46 cubic feet. It climbed to 61 cubic feet by 1940 and has increased slightly since then. In other

words, based on the past 20 years, wood is holding its own in the general economy.

For my part, I am prepared to see a continued tremendous population increase, a sustained per capita use of wood, and a reduction in the forest acreage in the South. Does this imply danger of a timber shortage? By no means, if we apply ourselves diligently to the task of building up our forests.

The South is still the location of the bulk of the forest land which is burned every year. Our fire prevention measures must be extended to every forest acre in every southern state. Also, all forestry groups should continue to try to interest more small landowners in tree farming. As a class, the small owners are at the bottom of the list as regards measures to make their lands productive. There are about 1.75 million owners in this category in the South. Eighty per cent of them own less than 100 acres of forest land. Yet in the aggregate, their properties total 125 million acres—more than five times the total ownership of the paper industry! It is generally recognized that the small landowner—not the large—will shape the South's forest future.

There are many problems pertaining to forest production which must be answered for the small owner. He is in no position to undertake work in the field of forest research. For instance, should he favor pine or hardwoods on his land? If pine, how may he best rid his forest of unwanted hardwoods? Many small landowners are joint agricultural and tree farmers. A farmer no longer asks for corn seed at the store. He specifies a particular seed—usually hybrid—which has

been developed by scientists to increase his corn production. But the tree farmer must still plant seedlings as offered by the state forestry nursery, and these are young trees developed without as much thought of genetics as that devoted to seed corn 15 years ago.

The study of forest genetics is in its infancy in our country, but not even the most enthusiastic scientist has expressed the hope that forest genetics will be as fruitful as genetics in agriculture. But beyond question tree breeding will help us to meet our forest requirements in the year 2000. Already a strain of slash pine with the capacity to yield double the average quantity of crude gum has been developed by Forest Service researchers in Florida. A strain of drought-tolerant loblolly pine has been found in Texas. Seed studies have revealed that, at least for certain species of trees, the source of the seed is of great importance. For example, loblolly pine seed gathered in Louisiana produced faster-growing trees than seed of the same species collected in Georgia and Arkansas but planted in Louisiana. Slash pine trees did not follow the same pattern, a fact just as valuable to foresters in a negative sense as the positive results for loblolly pine. Dozens of large wood-using companies are developing seed orchards. These vary from four to 400 acres in size. On these areas twigs from selected trees having desirable characteristics are grafted to root stock. When about 10 years old, the grafted trees will begin bearing seeds, literally giving birth to a new generation of trees having the desirable characteristics of those from which the twigs were collected.

Characteristics which foresters regard as desirable are those pertaining to growth rate, number and size of limbs, proportion of dense wood to porous wood, resistance to disease, and others. Dense wood is stronger than porous wood and also yields more pulp per unit of weight. Geneticists do not know that they can develop a strain of trees having dense wood, but they are hopeful.

The South is blessed with all the factors which together make tree farming profitable. It has valuable species encouraged to rapid growth by a warm climate and plentiful rainfall. It also has abundant markets for pine timber and is fast developing more attractive markets for hardwoods.

But there is another climate other

than the natural one which can be more important to the tree farmer individually and the South as a whole than the combined total of the factors just listed. This is the man-made or political climate. Largely because of misunderstanding on the part of our law-making bodies, this political climate may render impossible the successful business operation of a tree farm or a wood-using industry.

As a means of contributing a few facts toward a clarification of some important matters misunderstood, let me state first that tree farms and wood-using industries are equally important halves of the same whole. Obviously without raw materials there can be no industry. Conversely, without industry to provide a market for raw materials, there can be no tree farm. To hurt one is to hurt the other. To affect the operating expenses of one is to affect those of the other. Lawmakers in general are prone to overlook this all-important relationship.

When the political climate affecting tree farming is mentioned, probably the first thought is taxes. Obviously this is a most important matter. The tree farmer asks no special treatment as regards taxes; all he desires is fair treatment. For instance, if his local situation calls for an ad valorem tax in timber, he asks that the fact be recognized that his crop is taxed every year—over and over again—until it is harvested. The crop of the agricultural farmer is taxed only once before harvest. In general, taxing bodies are reasonable. But when they become unreasonable, the tree farmer, or for that matter the local wood-using industry, suffers. These facts are evident.

Not so evident, however, is the overall effect of a successful tree farm on taxes in general. Whether it be a land tax, ad valorem tax on timber, or timber severance tax, this direct tax on the tree farm is only a small portion of the total taxes which accrue to government through its operation. A specific tree farm in the sandy coastal plain section of Georgia provides a splendid example. The land was too low in fertility for successful farming. Cut-over and burned over, 5600 acres of pine land were purchased in 1938. There was no timber of salable size present, and the entire area was incapable of providing work for a single man. The only tax derived from the property was an ad valorem land tax. However, because

this tax would have been paid regardless of the type of land use, I shall not mention it again. For several years after purchasing the cutover land, the owner was plagued with forest fires. There was no state-supervised fire protection, and the owner nearly gave up trying to do the job singlehandedly. In 1946, however, the county in which the tree farm was located was placed under state-supervised fire protection.

Total expenditures for that year by county, state, and federal governments were \$469. Tax receipts were zero. In 1951 expenditures by the three governments were \$721 and the estimated tax receipts \$1000. And in 1957 expenditures by county, state, and federal governments were \$972, from which they derived \$5960 in taxes. In other words, every \$1 spent that year by government to help develop the tree farm through fire prevention brought in \$6.13 from tax receipts.

Bear in mind that the ad valorem tax of \$1081 was not included and that, even more important, the tree farm was still young and for that reason not more than half as productive as it will be in another 20 years.

Revenue from gasoline taxes alone exceeded total governmental expenditures. Gasoline was used for a tractor plowing fire breaks, for planting seedlings, and for transporting forest products to market.

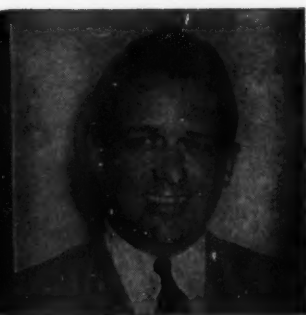
There have been many promises from sponsors of projects financed by taxes that these projects will pay off in public benefits. The figures for the Georgia tree farm leave no doubt as to the payoff from forestry. I submit that rarely are tangible financial returns to government so clearly reflected from the expenditures of the taxpayers' dollar.

Another tax matter of great importance to the tree farmer has to do with the treatment of profits from the sale of timber as a capital gain. In 1943 the Internal Revenue Code was modified to allow for the capital gain treatment of profits or losses from timber sales. Congress was aware that timber growing is a long-term investment faced with many hazards. Realization from the investment is long deferred. For these reasons, increments of value in timber accruing over long periods of time should not be concentrated in any one taxable year and taxed at regular income rates. Yet there has been a strong attempt within Con-

(Turn to page 68)

Reading  
about

# RESOURCES



By MONROE BUSH

## The Larger Perspective

SEATTLE's World Forestry Congress means many things to its participants. Without exception, authorities from each of the proliferating areas of specialization and subspecialization find in a conclave of this sort new focuses of interest and new fodder for their files.

When the dust from the brain waves has settled, however, one fact should stand forth boldly and crystal clear: the world's population explosion has indirect, though absolutely fundamental, effect upon every aspect of forest management and wood products use. Whatever a specialist's field may be, the context for his work is increasingly influenced by the growing numbers of people who each year demand both the space and the materials which are required for a decent living level.

This basic tenet must necessarily permeate the suppositions of the World Forestry Congress. And it makes especially significant for the members of this Congress a new book entitled **Land for the Future** (Johns Hopkins Press, Baltimore, 1960. 570 pp. \$8.50).

Sponsored by Resources for the Future, Inc., **Land for the Future** was authored by three members of that staff who are real "pros" in resource management: Marion Clawson, R. Burnell Held, and Charles H. Stoddard. The combined talents of these men are formidable.

**Land for the Future** would very likely never have been written were there not a population explosion. The book's point of departure is that the U.S. population may rise from 175 million to 310 million within the next 40 years. It is, therefore, a study of the possible influences of this 40 per cent increase in

people upon the unexpandable total land area of the continental United States.

Here is a subject of tremendous import for every forester. It is a subject that our visitors from abroad must be no less concerned with than resource managers in the U.S. To be sure, **Land for the Future** directs itself solely to our own national problems, but it does so in a manner, and with a thoroughness, that will unquestionably be helpful to students the world over who cannot escape the imperative issues arising in the equation of land vs. people.

Examined critically, the book is not much fun. It is badly over-written. And while the reason for this is obvious—the authors are desperately anxious to be as accurate as possible—some tight editing would have been helpful, and it could have been accomplished without doing violence to the book's almost painful objectivity.

Hotly controversial issues, such as wilderness preservation, the addition of private lands to the national forests, and the transfer of national forest lands in certain select instances to the national park system, are either avoided altogether or are skirted in a neatly inoffensive way.

All three authors are quite properly capable of the most constructive controversy, and at one time or another each has been neck-deep in the fray. But in the preparation of **Land for the Future** it is apparent that a solemn decision was made to avoid the vigorously contested questions in favor of a quiet, scholarly exposition of the land-use situation.

Some readers will undoubtedly attack various aspects of the book, and this is wholesome, but they will

have no case for shrill argumentation. Clawson, Held, and Stoddard have simply refused to bait their critics. And while the result is sometimes laborious, and at best in the cadence of a waltz step, **Land for the Future** has the great virtue of putting into the hands of its readers a huge amount of useful information.

There are three distinct divisions to the work. The first chapter, "The Land in Time and Space," sets the stage. The last chapter, "Future Land Use in the United States," gives a summing up. The chapters between discuss at length the past, present, and future of recreational, agricultural, forest, and grazing land uses. Emphasis is often heavy upon the historical development of a particular use, and upon its present status. Sometimes one might wish a little more had been said in exposition of future alternatives. But here again we meet the book's objectivity, for the authors are loath to make any statement that has not a reasonably satisfactory support from existing data. And repeatedly they lament the fact that so little of the desirable data has been properly compiled by those agencies which are in a position to do so.

At the very conclusion of their work they provide a compact résumé, which they call "a few very summary statements." These are worth reviewing:

"1. Large shifts in land use, from one major use to another, are unlikely in the future, at least up to 2000. . . .

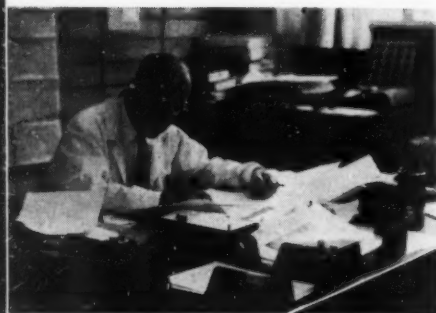
"2. Some changes in major land use will take place. They will tend to be localized. . . .

(Turn to page 82)





The Angerman River transports logs from the wild forests in the mountains of Sweden's hinterland.



Dr. N. T. Mirov in his office at the Pacific Southwest Forest Experiment Station.

## A STRANGE

By NICHOLAS T. MIROV

ONE warm and endless afternoon last summer I sat on the bank of the turbulent Angerman River, watching it rush over granitic rocks toward the Gulf of Bothnia. Thousands of logs floated by, disappearing under the foamy blue-green water then reappearing again on its surface in a long journey from the mountains of the Swedish hinterland.

When alive and growing, some were tall slender pines with bright reddish bark and lacy crowns; others were somber spruces, their gray trunks wrapped in mantles of dark green branches. In the winter, before the logs were rolled from the forested slopes to the river, they were stripped of their bark and branded. Now they were floating down the stream, all alike in their nakedness, all emanating a faint, pleasant odor of freshly-cut, slightly fermented wood.

When the logs reach the placid Angerman *sund*, they are sorted and boomed, and towed to the mills by busy, small tugboats. There the logs are cut into chips, cooked, and converted into pulp and paper and cellulose. Ocean freighters carry the finished products to many parts of the world.

As I sat on the bank of the stream I thought—how strange it is that this multimillion-dollar industry is based on nothing more than the annual growth of Sweden's wild forests.

During the previous summer, when the days were long and warm, nature produced a certain amount of wood and deposited it in the trunks of the trees. About the same amount of wood, accumulated by annual deposits, was cut during the following winter. How many summers must pass to grow enough trees of merchantable size to equal the annual cut? In warmer parts





The application of genetic laws to forestry is becoming more prevalent. Tree breeding is now practiced in many countries, but 50 years ago such a thing was unknown.



Youngsters enjoy walk through wooded area planted to hybrid Christmas trees.

## FOREST TALE

of the world this "rotation age" may be no longer than 10 or 20 years, but in Sweden, where summers are short, more than 100 years of annual deposits of wood are required.

Foresters call this practice "sustained yield." The efficiency of forest management depends on how closely an annual cut in a forest approaches its total annual growth. When more wood is removed from a forest than nature can replenish, the forest will suffer and even perish. This has happened in many parts of the world. When the annual removal of wood is smaller than the annual growth, the surplus left in the forest is wasted.

Sustained yield management is a delicately-balanced operation. Fire or insects, severe drought, or strong winds may destroy large forest areas. Such damage must be repaired at once. That is why numerous forest nurseries are scattered all over the

wooded part of Sweden: acre upon acre of neat green rows of pine and spruce seedlings growing in clearings under the protection of surrounding old trees. These seedlings are used to replant devastated land and to keep forests in their state of sustained yield.

As my thoughts wandered from the floating logs to the forests and to the nurseries, it occurred to me how strange it is that a forester who wants to replant his land goes to the woods, gathers seeds from wild trees, nurses his wild seedlings for one or two years, and uses them to perpetuate his wild forest. In agriculture the practice of gathering seeds of wild plants was abandoned hundreds, if not thousands of years ago. Only in the remotest corners of the earth do people still gather wild seeds to supply their needs.

In forestry, gathering wild seeds is still common, even in countries

like Sweden where forests have been managed for a long time. Foresters have attempted to introduce new blood into wild forests by gathering seed from the best-looking trees; these attempts have not always been successful, however, for there is no assurance that the tallest and straightest selected tree will produce a tall and straight offspring. This is so partly because the pollen parent remains unknown and partly because the seed trees often look *élite* not because of noble birth, but *comme chez nous*, because of an unexpected opportunity—more food for their roots or more light for their crowns.

During the ages of agricultural domestication, cosmic rays produced many useful mutants, plants hybridized, their chromosomes doubled and quadrupled. Nature put rich genetic material at the disposal of

man. When Mendelian principles of inheritance became known to man at the beginning of the 20th century, it was easy for him to apply them to the urgent needs of agriculture.

Development of forestry has been different. Virgin forests were abundant, offering man an apparently inexhaustible supply of wood. When the forests of western Europe became depleted, others remained in eastern Europe and even much more in Asia and in America. There has been no urgent need to search for hybrids, polyploids, or mutants. The forester has not considered forest trees as domesticated plants.

Forestry has operated on Darwinian principles. The forester's job has been to assist nature in the survival of the fittest trees in their struggle for existence and for supremacy. By removing suppressed trees, the forester provided more light and nutrition for those which he had designated as *élite*. He cared little whether the appearance of his selected trees was caused by noble origin or by favorable environment.

When Mendelian principles became known to foresters, a few attempts were made to domesticate wild trees. What could have been

more logical than to hybridize desirable trees and grow superior seedlings for the gradual replacement of wild forests? But foresters knew only too well that although Mendelian principles could be applied to forestry, there would be a great difference between genetic improvement of a long-lived forest tree and of an annual cereal that completes its life cycle from seed to seed in one season. The difficulties appeared to be insurmountable.

Nevertheless, the impact of genetic laws on forestry is growing. Now tree breeding is practiced in many countries. The oldest forest tree breeding institute in the United States was founded in 1925 by a Seattle lumberman, James G. Eddy, at Placerville, California. It is now one of three forest genetics research centers maintained by the U.S. Forest Service. Even in northern Sweden, with its desperately short growing seasons, I saw forest nurseries where superior seeds are sown; the best seedlings are transplanted to "seed orchards" and grown to produce pedigreed trees. Fifty years ago such a practice was unknown.

Replacement of wild forests with domesticated trees is a slow process, but foresters are used to caring

for their long-lived patients. It is strange indeed, I thought that day beside the Angerman, how often a forester does not see how his planted forest will look at maturity. His work is based on faith in the future. When he is lucky enough to see his forest harvested and replanted with superior trees, I daresay he is the happiest and proudest man in the world.

During this century we will see in the warmer parts of the world extensive planted stands of superior trees; in cooler regions progress will be slower. Gradually all productive forests of temperate climates will be replaced with genetically-improved trees—trees of rapid growth and heavier wood, trees resistant to insects and diseases, trees containing more cellulose and less lignin. Some day wild trees, majestic in their primeval splendor, will be found only in sanctuaries and in wilderness reserves. There visitors will say "this tree probably is an ancestor of that . . . you know, that recently developed successful long-fiber hybrid . . ." even though the parentage of improved trees may be as uncertain in that distant day as is the name of the wild plant which was the ancestor of our wheat or maize.

## Forestry Under a Free Enterprise System

(From page 27)

an "upstart"—a judgment which, in retrospect, I think may have had considerable merit. We both wanted to see good forestry practiced in the woods. He believed in forestry by compulsion of legislation; I believe in forestry by economic motivation. Had he lived to the last decade I am confident that he would have seen good forestry as less dependent than he once thought on fiat of law and more dependent on forest owner choice coupled with the wholesome public and private co-operation which, with the leadership of the U.S. Forest Service, state forestry officers, and trusted industry agencies, has come in recent years to dominate the march of American forestry.

Let me illustrate. Forty years ago, just after World War I, the National Lumber Manufacturers Association, of which I was then the manager, undertook a nationwide survey of the extent of industrial forestry practice in this country. We found amongst the larger operators only three companies engaged deliberately in forest management with view to continuous operation, one each in the South, the Lake States,

and on the Pacific coast. Millions of acres of cutover lands were then tax-delinquent, awaiting tax forfeiture. Today there is scarcely a single substantial forest industry operation which is not actively interested in keeping its lands productive and in encouraging its neighbors, large and small, to do likewise.

In 1934 the lumber and timber products industries, through Article X of the Lumber Code under the National Recovery Administration, committed itself to a Forest Conservation Code which prescribed acceptable forest management practices, devised by representative industry committees. In submitting this code for the approval of the President we stated: "This is an industry undertaking. It will be so administered." I have the first copy from the press of the Government Printing Office of this code. In the upper corner it contains the famous and familiar notation of the late President of the United States: "OK. FDR." It was given to me by the then Secretary of Agriculture, Henry A. Wallace.

A vigorous effort was made to secure general compliance with the Forest Conservation Code. This was, however, short-lived. The Supreme Court in 1935 declared unconstitutional the National Industrial Recovery Act under which the Code was formulated. But the industry interest in forest conservation aroused by the Code was not abandoned. In 1934 was incorporated the American Forest Products Industries, now the noted and trusted national spokesman for the conservation interests of the major forest industries. As its first president I arranged for a nationwide survey of practical ways and means of continuing to foster the industrial forestry interests initiated by the Code and of doing this solely as an industry enterprise, in co-operation, to be sure, with the appropriate federal and state agencies, but without dependence on them.

Out of this initiation a few years later grew the system of American Tree Farms with its roots now embedded in the forest soil of virtually all the states of the union. The

first official Tree Farm was dedicated in Alabama over 20 years ago. Contemporaneously a giant Tree Farm was dedicated with appropriate ceremony in the state of Washington. Only last month another Tree Farm was established in Alabama, representing the 50 millionth acre of private lands dedicated in this way, under the auspices of American Forest Products Industries, Inc., to permanent forest production. Twenty years ago industry critics referred to the Tree Farm movement as "window dressing." Of late, the forest industries have been content to let the facts speak for themselves.

Seven years ago about 150 million tree seedlings were planted annually. Last year two billion were planted. Forest lands, with rare exception, are no longer on the delinquent tax rolls. The permanent productive value of forest soils has become, during the last 20 or 30 years, a generally decisive factor in the economy of private forestland ownership. Gifford Pinchot and the host of followers of his forestry creed would have been astounded, if not perhaps confounded, by these great transitions of the last quarter-century. They would have given forthright recognition to the simple present-day fact that the important goal of forest conservation is not to avert a timber famine but gradually to increase the permanent productivity of forest lands.

Theodore Roosevelt and others of his persuasion in 1905 knew well that the intelligent management of forest resources, and especially timber management, could only be achieved with the aid of an enlightened forestry profession and an enlightened forest industry. The American Forestry Association—with its first great goal realized—extended a helping hand of encouragement to the forest industry. Unlike the wave of muck-raking which occasionally gripped the nation during that period, the AFA never turned aside from the path of constructive criticism. As a result, the wood industries, particularly the lumber industry, were never driven completely into the particular Hades reserved for the victims of the less responsible muck-rakers of the time.

Nevertheless, it was a thorny and tortuous path for free enterprise, particularly for the lumber industry in that period. True, there had been excesses in most industries using natural resources during the

period of almost incredible westward expansion. But the muck-raking writers of the Theodore Roosevelt period largely forgot that to the pioneers of past decades the "man with the axe" had been hero, not villain. He had cleared the land for farms and communities. He had provided cheap materials with which to build a nation and it had been built in jig time and on a scale never seen before. In those years, the lumber production increased rapidly, reaching an all-time high in 1909 of 44.5 billion feet.

This period, of course, had its share of what the critical press called "unreconstructed lumbermen" and "timber barons." It was also true, and a much more important fact, that private forest management as we know it today, fundamentally a matter of profit and loss, was beyond the capacity of timbermen generally of the period. Forestry just did not pay. There was too much virgin timber seeking liquidation before it rotted on the stump.

This was an era of terrific competition created by the sheer vigor of an expanding economy. As the late Colonel William B. Greeley wrote in *Fifty Years of Forestry in the U.S.A.*, "First, of course, came the wealth of virgin forest—great stretch after stretch of free timber inviting daring men and venture capital. Then came the rapid extension of transportation. Efficient, low-cost rail and water facilities constantly pushed sawmills into virgin regions and brought their products back to compete with those of old manufacturing centers. A third important factor was the mechanical progress in mass production of lumber and other forest-grown commodities. Larger and more efficient mills constantly reduced the unit cost of production."

Volume production was the main-spring of this development. The competitive quest for the cheapest lumber constantly drove manufacturers into opening new stands with the latest and most efficient mills. As Greeley recalls, lumber financing had no small part in the "cut out and move on" fever of the times. The industry commanded large capital resources. It borrowed freely. There was the inevitable proportion of speculation and shoe-string operations. But the timber bond, which financed many solid enterprises, was drawn upon a fixed schedule of timber liquidation. Every thousand

feet of stumpage paid its quota into a sinking fund for bond redemption. Very often, indeed, debt requirements forced the depletion of timber on glutted markets.

"All of these elements contributed to the liquidation philosophy of forest conservation 40 years ago," Greeley wrote. "This period added a colorful chapter to the westward expansion of America. However we may regret the wasteful features of American lumbering, we must recognize its vast contribution to home-building and to farm and industrial development. The industry gave the whole country an incomparable supply of cheap construction and industrial materials. And it is hard to conceive how, under a free economy, some such progress could have been avoided before we reached a sound foundation for industrial forestry."

Even as the larger sawmills were moving from one region to another like threshing machines through fields of ripe wheat, the public gradually became more and more appalled at the residue of stumps and the aftermath of uncontrolled fires. Spokesmen for reform contended that the industry was truly "mining" the land. The same thing was true of virtually every other industry in the big new country of free land and abundant resources. But people who appointed themselves as voices of authority on timber preservation seldom went down into a mine or visited a slaughter house. Few spectators set themselves up as judges of mining and meat-packing, but even casual observers were certain that any logging operation was replete with sheer and abominable waste. And so it seemed.

By the 1920's the crescendo of public protest against lumbering operations had reached new peaks aided and abetted by Mr. Pinchot, who was chafing at the delay in securing enforceable forestry regulation. The AFA, which had had Mr. Pinchot's plaudits for its part in establishing the forest reserves, now began to receive his criticism for declining to add its voice to the clamor for public regulation. Mindful of the advice of experienced early leaders of forestry, the AFA believed that the very loggers who had hacked their way across the continent were paving the way for a forestry advance on an unprecedented scale. It saw the cracks already appearing in the wall which



## Forestry Under a Free Enterprise System (continued)

showed sawmills shutting down as they ran out of available timber supplies. It believed that a great transition—the transition from cheap virgin supplies to the managed production of timber as a crop—was on the near horizon. It agreed with Greeley that the lumber industry was a "sick industry" much more than a "willful industry," as Mr. Pinchot contended.

The point in the time scale at which the trend toward industrial forestry began in the United States may not be fixed precisely. But there are some significant milestones. Some people would place it immediately after World War II. Others would date it from the founding of the national forests and the establishment of the great U.S. Forest Service. If I were asked to put my finger on a specific date, I think I would say 1923 with the passage of the Clarke-McNary Act, around which has gradually been built a workable policy of public and private co-operation in dealing with many of the most formidable aspects of forest conservation.

In 1926, when the public criticism of the lumber industry was at a peak, I wrote an article for AMERICAN FORESTS entitled, "A View of the Woods from Within" in my capacity at the time as the executive officer of the National Lumber Manufacturers Association. In that article I made what may have been one of the first pleas for "dollars and sense" forestry when I wrote, "Now, the fact, perhaps a brutal one, is that forestry, with the private landowner, is fundamentally a matter of dollars and cents. He cannot do anything with his land that is beyond his resources or contrary to commercial survival. The lumberman is a land owner who has acquired land because of its native stand of timber. A mature forest is as much a natural deposit as a copper mine. It is there to be used, not preserved. Even nature will not preserve it, for every ripe tree is doomed to dissolution; and every forest in America stands on the bones of its ancestors. There can be no forest management, no forestry, no important tree growing as long as the earth is encumbered with forests in maturity and senescence. The producing forest is the growing forest. As Fernow said long ago, 'The ax of the lumberman

is the beginning of forestry.'"

In reply to critics, I then wrote, "I would not be understood as advocating a blind let-us-alone policy. The public—the states and the nation—have so many interests in an abundance of forests that forestry must be fostered with a view to backing nature with policy. Taxation must be studied and adapted, protection against forest fires must be had, wood utilization must be advanced, silviculture must be taught, forestry must be exemplified, and woodsmen must be educated and kept in line with the times. Our state and national forests are indispensable both as sources of material and exemplars of forestry and should be greatly extended."

Then I stressed what was uppermost in my mind at that time, the fact that "we need a merger of the unattached friends of the forests and the utilizers of the forests. There is no chasm between them. Every lover of the forest has practical needs of its products, and every industrialist of the woods is also a citizen with all the citizen's love for and social interest in the forests. One group represents an idealism and the other a practice. But the individuals that compose them are to be found in both. We are in an era of change in which neither pure exploitation nor scientific forestry is the rule, nor desirable. Those who live by the forests and those who love them have no irrepressible conflict."

Finally, I said, "While the economic motivation is obviously fundamental in the creation of private forestry, it is not by any means all of the process. The tradition of 'inexhaustible' forests that grew up during the centuries of superabundance must be countered with a new tradition of production as well as consumption. We need to build up an inspiring new business concept of tree-growing as a profession. . . . We need to impress the national consciousness with the idea that forests are as essential a part of national land economy as agriculture. . . . We must build up policies that will foster the forests. We must have scientific research that will show us how to turn the physical waste of logging and sawing into the highest possible form of economic value. We must convey to the public the sound idea that

forest utilization, instead of being forest depletion, is forest reconstruction." That was in 1926. Much water has run over the dam since that time. But the basic ideas have not, I think, lost their validity.

The very fact that AMERICAN FORESTS would at that time have published an article of this nature by an industry spokesman regarded by some forestry zealots as "suspect" is one more indication of the open-minded attitude which the AFA has always maintained in advancing the "wise use" philosophy of forests and in looking to the long future. I would not like to be understood as implying that the conservationists were entirely wrong and industry was entirely right. Both, to a degree, were right; and both, to a degree, were wrong. Certainly the fervor of the conservationists had much to do with goading to action a sluggish industry accustomed to the convenience of "cheap timber." The threat of regulation and the later proposals to subsidize the industry like agriculture were potent stimulants to a growing industry interest in forestry. While lumbermen were fretting over the walloping they continued to receive regularly from the critical press, they were even more concerned with the loss of markets to what they regarded as "substitutes" for wood. While steel, patent roofing, wall board, paperboard, and other products continued to gobble up traditional lumber markets, the lumber industry as a whole was not making any substantial concerted effort to stem the tide. In some ways it exercised its wish-bone more than its back-bone. Clearly new measures and new ideas were needed to arouse a "sleeping giant."

And new ideas were forthcoming. In 1927 several hundred lumber and timber companies, under the auspices of the National Lumber Manufacturers Association, joined in the support of a "million dollars a year for five years" national trade extension campaign. This program, featuring "Wood—Use it—Nature renews it," had a wholesome effect. It strengthened the industry's national consciousness and its confidence in its ability to do collectively what individual companies in a widely-scattered industry cannot do for themselves. This industry confidence is an important part of the present-day (1960) multi-million dollar campaign of the NLMA to "restore, improve, and strengthen the markets and uses of wood products." Another aftermath of the



pioneering campaign in 1927 has been the work of the Timber Engineering Company, which for a quarter-century has been a potent factor in modern timber construction.

Another new idea came from the Pacific Northwest. In 1928 the West Coast lumber industry persuaded U.S. Forester Greeley to come West and take charge of the destinies of West Coast lumber industry activities. This at a time, mind you, when foresters were generally regarded as "professors" by most woods operators and where the production boss was the real hero. This was the start of a great influx of foresters into the industry, which today has reached a peak of nearly 8,000 industrial foresters, many of them in key administrative positions.

Another development of key significance in forestry was the rapid growth of the pulp and paper industry, particularly in the South and the Northwest. Representing investments in millions of dollars, a modern-type pulp mill cannot readily pick up and move to a source of new supplies. It is dependent on nearby timber supply. Many larger firms have hundreds of foresters on their payrolls to manage their timber on extensive company holdings and to encourage small landowners in adjacent areas to grow timber as a crop. In areas like the South, where pines grow three feet in height in a year, the value of forestry and the profits to be had from it are easily demonstrable. The South today has become the greatest cellulose factory in the world. Many concerns, starting as one-product sawmills, are gradually adding processing, factory, or byproduct plants. This has been augmented by a spectacular upsurge in forest research, one notable example being new processes to produce woodpulp from short-fibred hardwoods.

By the 1940's private forestry was in transition to the forest management concept. Among the factors contributing to this advance, great weight should be given to the rising value of all types of stumpage, including types previously regarded as "weed species." Timber depletion due to the drain of two world wars and the continuing defense demands have kept timber prices relatively high; as a result, forestry is today being practiced on both private and public lands at an accelerated rate. But many hurdles remain.

From the first, one of the highest

hurdles facing private forestry was to obtain favorable recognition by the business and financial world. This has been a slow process. Even the national forests for many years were "custodial" rather than "managerial." Originally, there was little demand for national forest timber. Even had there been much demand, there were not enough trained foresters to have managed it properly nor enough roads to reach it. Only in recent years has an effort been made to really protect the forests and take the full allowable cut—an effort which has tended more and more to put the national forests "in the black."

As a result, the financial world for years regarded cutover forest land as "unimproved land," with no recognition of the fact that trees, under good management, could be a valuable crop.

Most of the "breakthroughs" have been in recent years. Much has been due to the Tree Farm movement and its objective of supplying "Trees for Tomorrow," to borrow the Wisconsin phrase. The most helpful development was the enactment in 1943 of the Capital Gains Amendment to the Internal Revenue Code, which recognized gain in growth or value of timber, when realized in the sale of timber products, as "capital gain" rather than "ordinary income," and hence taxable at much lower rates. This fortified the whole range of American forestry. In the opinion of many people, it represented the biggest single practical boost which forestry had ever received. (Editor's note: Dr. Compton, as executive head of the National Lumber Manufacturers Association and AF-PI at that time, is generally given credit for having been the prime mover in this important development.)

In the early '50's another related development was the recognition by large insurance firms of well-managed forest lands as solid long-term investments. Finally, in 1953, industry and banking leaders came riding out of the West urging that even national banks be authorized to make loans up to 10 years on well-managed forest tracts. Such authorization was achieved. Suddenly the New York financial community awoke to the fact that "timber is a crop" and forests are a continuously renewable resource.

These gains represent solid recognition of the growing stature of forestry as a profession and forest industry as an enterprise. They have been solidified by the much-improved relationships in the past decade or so between the forest industries and the public foresters, who have shown a new willingness to pull together in the same harness. In addition to the growing army of professional foresters in both industry and the public services, the advent of the forestry "consultant" also has given the profession a new range of opportunity. Hundreds of consultants have now "hung out their shingles" like doctors or lawyers and are selling their professional services to forest owners. Hustle, combined with the latest forestry know-how as taught by the forestry schools, enables these young men to forge ahead rapidly, particularly in the South and Northwest.

These gains have been reflected in the *Timber Resource Review* of the United States Forest Service, released in recent years, which shows for the first time that growth and timber drain today are *quantitatively*—although not *qualitatively*—in balance; and that the danger of timber "famine" in any important sense has been averted. At the same time, the Review shows clearly that

## CHLOROPHYLL SYNTHESIZED

**H**ARVARD University announced last month that Professor Robert Burns Woodward has successfully synthesized chlorophyll. It was reported that about six hundred-thousandths of an ounce of chlorophyll have been produced in the laboratory.

The Harvard statement declared that the synthesis "proves once and for all the structure of chlorophyll, slowly derived during the past 40 years by chemists in many countries." The report also said that this new knowledge about the chemistry of chlorophyll "may help biologists to understand how this molecule enables plants, during photosynthesis, to capture the sun's energy and store it in sugars."

## Forestry Under a Free Enterprise System (continued)

our rapidly-increasing population combined with ever-increasing demand for forest products calls for continuing concerted effort to improve the quality and expand the quantity of forest production. While the public and the larger industrial forests are now, for the most part, being managed well, the Review shows that a more vigorous effort is required to bring the so-called farm "woodlot" and small forest ownerships into the forestry orbit. In all probability, availability of markets and improved state tax structures will be major factors in this direction.

Forestry has made good strides in the United States in 50 years. The slackening of demand for lumber has been largely offset by increasing demands for other products of the forests such as pulp and paper and plywood. As F. K. Weyerhaeuser, eminent third-generation timberman, commented recently at the 50th anniversary of the U.S. Forest Products Laboratory, "The overall result has been an increased demand for trees and such an increase in their market value that private industry can earn a small return from its tree-growing operation."

In general, it may be said that forestry in America today presents a hopeful but not a completely rosy picture. Each year thousands of young forestry graduates find employment in public or private forestry. New programs to improve the management status of the 181

million acres of national forests are constantly being initiated. The industrial forestry picture is hopeful with every indication that big business in forest management is here to stay. But the *Timber Resource Review* revealed that we have 489 million acres of commercial forest land, including public and private ownerships. This is all there is—there isn't any more—and the prospect is that acreage will shrink in years ahead. This places a premium on more intensive management of the land we have. Nearly 52 million acres of our forest land is now virtually idle; some 114 million acres are less than 40 per cent stocked with growing trees; average timber quality is still declining; one-fourth of the timber cut is not used; and insects, disease, and fire annually kill some 13 billion board feet of timber, an amount equivalent to nearly a fourth of the net timber growth. This is the measure of our "unfinished business."

Present situation and prospective need points to the necessity for planting billions of trees every year and helping nature to plant billions more; for stepping up control of destructive forest pests; for improving the utilization of the timber now being cut; and for keeping recently cut-over lands productive. Some believe that these objectives can be accomplished only by vesting more power and authority in the federal forestry agencies, but still more people, in pointing to the for-

estry progress of the last 50 years, believe that it will be done more effectively and more securely under a system of sensible state forestry codes, with the co-operation of federal and state agencies, and with fundamental reliance on the persuasions of free enterprise which, over the years, has achieved so mightily for America. My own view is now, as it was 40 years ago, that the high road to forestry achievement is to be found not through the compulsions of legislative fiat but through the vigors of economic motivation guided by a growing sense of public responsibility for constructive stewardship of forest resources both public and private, and implemented by the high order of understanding and co-operation of which the forest industries and the agencies of government alike have shown themselves to be capable. Time will tell.

Meanwhile, the implementation of the three BIG goals for forestry as outlined by the Fourth American Forest Congress of 1953 remains the forestry order of the day. These are: 1) to meet the essentials of forest protection; 2) to improve the national timber crop in volume and quantity to a degree sufficient to wipe out all deficits and build up a reserve; and 3) to obtain the maximum of economic and social services from our forests by realistic application of the principles of multiple use in their management. This is a mighty challenge to both public and private effort. America's "wood pile" is not yet secure. But it can be made secure.

## Foresters: Look to the Soil!

(From page 18)

tent of strong mineral bases (especially potash, calcium and magnesium) normally being considerably greater than the content of strong mineral acids (sulphur, phosphorus, chlorine). The earlier bringing to the ground of twigs and branches through the thinnings and their subsequent decay thus adds to the basic elements in the soil, counteracts excessive acidity, and thereby increases the forces which are striving to re-establish ideal soil conditions.

3) The removal at small intervals of some larger trees scattered through the stand, preferably every year, will steadily give new possibilities of breaking the vicious circle of soil deterioration often existing in

the overdense unthinned stands where heavy root competition in the rather shallow layer of decaying litter deprives this of sufficient ammonia-nitrogen for the normal transformation of decaying organic material into durable humus so essential to a normal and balanced soil fertility.

If the tree roots of a certain tree in a young stand steadily outcompete the normal humus production in the soil through special means (mycorrhiza) of securing available nitrogen for continued tree growth at the cost of the formation of durable humus, the result will be as previously explained.

The death of the young tree in

question, especially if it occurs suddenly (by thinning of a dominant tree), will immediately bring about a total change in the area hitherto solely controlled by the dense root web of this tree.

The acute competition for nitrogen ceases with the death of the roots and their mycorrhiza. The situation of nitrogen starvation is locally brought to an end and the fallen litter now can decompose in the normal way, releasing sufficient basic ammonia-nitrogen to locally reduce acidity and to start an island of normal soil conditions. If the removed tree was small, the roots of the neighboring trees might take over the released area and bring it

back into the vicious circle, but if it was a dominating tree and its removal is followed by that of other trees the following year, the chances for the released area to stay released of the heavy root competition are greater, and a general amelioration of the soil condition throughout the stand may be on its way within a few years. The vicious circle is broken.

This may occur also in the unthinned stand as it grows older. The stand breaks up through natural mortality, and increased light comes to the ground as well as large amounts of debris. The total nitrogen accumulation of the locality, which was reduced considerably by the clear-cutting of the previous stand, will again build up.

The development to a better soil condition will, however, be much slower in the unthinned stand, because sufficient light comes later and more gradually to the ground. The smallest trees disappear first through natural mortality, and the roots of the remaining more dominant trees have better chances of infiltrating the areas of the ground formerly occupied by the roots of outcropped and gradually dying trees; the sudden effect of the removal of a dominant tree and of the trash it leaves on the ground does not occur. Less desirable weeds offering root competition of the same kind as the conifers may gradually invade the area and depress production because they add nitrogen-poor and therefore more difficultly-decomposed acid litter to the ground and thus through their activity increase the carbon/nitrogen relation. Such weeds are salal and huckleberries. They are acid-loving duff producers and may post-

pone the natural soil amelioration. This could be brought about so much more easily through the light and frequent thinning of the young stands.

A suitable application of anhydrous ammonia or urea could within a few years bring about a total change for the better on a deteriorated soil, but light and frequent thinnings may be cheaper.

There is often reason to believe that the alternative: annual light thinning of the age classes 15 to 60 years, or no thinning, may within some 10-20 years lead to a difference in growth rate for the remaining part of the rotation, corresponding around one productivity class. This effect may with highly productive species as in the Pacific Northwest amount to a difference in total production of 30 to 40 cords per acre in a 60-year rotation, and if hereto is added a presumable saving in natural mortality (not occurring when careful annual thinnings can be carried through from 20 years of age) of some 20 cords, the intensive management may be seen to have a potential in production increase of close to one cord a year per acre compared to an old-fashioned management without any thinnings.

I would like to emphasize that I do not maintain that thinnings as such have a direct increment-increasing effect. It may be the case in quite young stands where the branches are still interwoven and where no important hole is made by the removal of a tree. However, in stands of 40 years or more I would rather believe that the direct effect of the thinning on high site classes represents a slight decrease in increment. In stands of 60 years

and more the decrease seems obvious. The above-mentioned growth increase which could be produced by the management of light annual thinnings solely relates to the indirect effects of the thinnings, established through improvement of the soil condition and to a possible and substantial saving of the natural mortality generally occurring between 20 and 40 years of age.

The light and frequent thinning technique will also lead to sufficient crown development in the stand for allowing a shelterwood-type regeneration of the stand when desired—the good soil condition and moderate shade in the well thinned stand will normally lead to ideal conditions for a natural regeneration which is not overdense, but well-protected by the more wind-resistant trees which remain. The soil deterioration derived from clearcutting can thus be avoided in the next generation.

However, these methods may for a long time not be generally adopted as conventional, as they require considerable skill and understanding to exercise the right way. Too many will always try to do it the easy way with too-heavy thinnings and too-long intervals, and therefore with poor results. The theme of thinning methods and that of management towards a productive capital reduction will always remain controversial subjects as they have been for more than 200 years in Germany, the birthland of intensive forest-management and of management theories.

Meanwhile, I am convinced that all foresters, both in the Old World and the New, should ever remember one cardinal precept, namely: "Foresters: look to the soil!"

## The Struggle For Mixed Forests

(From page 15)

that time not only was there lacking our modern biological knowledge, which lack permitted overlooking the effect of these measures, but in many cases the areas were cleared to such an extent and the tasks of reforestation were so difficult that they could be solved only through the pure planting of hardy coniferous species. There thus arose over considerable areas—often against the wishes of the foresters—in addition to mixed stands, pure stands of beech, spruce, or pine. Nevertheless, the re-establishment of forests that was carried out in the main between

1820 and 1850 must be designated a worthy deed which has remained exemplary to the present day in its purposeful execution.

Already during the last third of this period of the development and building of a planned forestry there occurred a reconstruction and re-orientation of the forestry system, which under the name "forestry statics" and "the theory of the net yield of the soil" was to influence for almost another century the thinking and performance of foresters. It was just as heartily propagated as refuted, attacked as defended. Not-

withstanding that it remained disputed, it shaped forest management in theory and practice until it finally succeeded in prevailing over it two or three decades ago. The incentive for its development was the necessity to arrange spatially the difficultly-overlooked forestry enterprises, to plan and regulate the temporal course of their production processes, and to trace out those factors which would guarantee the most favorable possible ratio of costs and yield. The forest system, economic activity, and technology demanded such data and advice as



were not yet available from experience or inductive knowledge so shortly after the beginning of a planned forest management. They had to be deductively conceived and derived. It is only too easily understandable that this work was carried out quite in the spirit of the times, that of liberalism. The forest was regarded as an asset, as capital, for whose highest return in interest management was to be concerned. It was thought that the highest return could be attained with mathematical formulas in which the total costs and receipts of a forest stand were prolonged to the end of its systematic cultivation period—with the use of tediously determined rates of return. A soil value was derived from the attained net yield of an entire cultivation period. If one included in the computation various species and various cultivation periods, there resulted a maximal soil value for a single species in a certain cultivation period. The goal thus arrived at was then realized in the practice. Lying at the basis of such computations was always a stand, not an enterprise; they did not proceed from the forest, but from heavily-felled areas, and were always related to pure, rather than mixed, stands.

It cannot be denied of this theory that it strived for the clear planning and goal-setting of forestry measures, as well as the control of their results, and also attained the recognition of their basic necessity. The mistake was that along with it an erroneous way was paved, in that it was believed that it was possible to compute in advance with mathematical formulas the vital processes of a forest and the economic development over the period of a century. That the locality was ignored as one of the main factors of forest production or strongly undervalued essentially worsened the situation. There thus arose the results, manifesting difficult consequences, of the theory of the net yield of the soil in Germany in that in large areas there was a transition from natural regeneration to naked felling, followed by the artificial planting of areas as the presumably cheaper and surer regeneration method; that in large areas spruce and pine, as trees with the highest yields, were planted in pure stands within and without their natural range; that the cultivation periods were drastically reduced; and that there was a transition from the conservation of use to that of production. That is, no

longer was the always-equal amount of use the measure of conservation, but the demand itself was that wood was to be produced in all areas.

Since long before the development of the theory of the net yield of the soil, pure stands had already been artificially established—the first, for example, in the late fourteenth century, and to larger extent since 1750—the effects could be already observed at the beginning. One of the first who not only could demonstrate them but could also create an audience for them was K. Gayer. He demonstrated that they are exerted on the locality—that is, above all on its soil, on the vitality of the stand and, therewith, ultimately on its yield. The effect on the soil consists in the changing of the structure and the nutrient system. Loss of rooting depth and biological soil activity led to dense bedding, loss of friable structure, excessive moisture, and, in extreme cases, to the formation of bog iron ore and the anthropogenic formation of high moorland. The accumulation of virgin humus cover interrupted the nutrient cycle; the humid climate induced podsolization and the washing out of important nutrients. The artificially established pure stands, often planted with the seeds of outside localities, proved essentially more susceptible to abiotic and biotic dangers than the natural mixed stands. Storms, wet snow, and fire ruined them over large areas, often before they could grow to a yield-rich age. In consequence, also independently, there occurred mass increases of insects, which led to the same result. In addition, fungus infections not infrequently disrupted young stands.

It is understandable that the effects of the pure planting of a species were strongly varied, depending on the locality and the stand. As a general tendency it can be said that the more unfavorable the climatic conditions of a locality are for a species, the poorer the soil, the farther out of its natural range a species is planted, and the longer this planting continues, the more severe are the effects. For example, if spruces or pines were planted in pure stands in localities in which they could thrive and withstand the dangers that beset young trees, then in the first generation their yield was usually considered higher than that of the natural stand, in part twice as high or even higher. To this phenomenon can be traced the astounding yield that the German forests gave within the last 50 to 80 years. The increased

yields were attained, however, at the cost of damage to the soils, which usually in the second generation of the pure stand led to an increase in dangers and to a rapid diminution of yield. Disregarding the increase of biotic and abiotic dangers, the damage of a locality often progresses so quickly that already in the third or fourth generation of a pure stand, the zero point—lack of yield—can be reached. The statements of K. Gayer on the effects of pure stands have proved fully correct; they were confirmed through the findings of numerous soil-science, yield-data, pathological, entomological, and silvicultural investigations. His statement of 1886 is still valid today: "At no time has the economic value of mixed forests been brought home to us so convincingly and impressively as in the last 10-year period and in the present, for our extended pure stands have suffered such severe and lamentable fates in this period that a decisive return to the previous concept of mixed forests must be effected if an assured economy for the future is not to remain in question."

Almost 50 years have passed since the evaluations of K. Gayer and subsequent investigators were able to penetrate as a common good in the forestry practice. The schools of forestry of Munich and Zurich distinguished themselves in the struggle for their recognition. If the attempt is made to present briefly the attitude of today toward this problem, this is again best done with the concept of conservation as it is understood today: conservation of production and use, both of which are recognized today as essential factors, can only be assured in healthy forests. J. N. Köstler says in his book *Silviculture* that this demand for a healthy state encompasses in its effect on the stability and yield of stands both the type of tree being planted and the soil.

The inclusion of the demand for healthy conditions in forests in the concept of conservation at the same time demonstrates the necessity of re-establishing it everywhere where it was disturbed or destroyed through the concepts of man. It also includes the call to remedy damages. This interpretation of the concept of conservation, which today is generally recognized in Central European forestry, and the emanating measures for the transformation of pure stands have led to many criticisms from the outside. The over-evaluation of biological and ecological importance, the neglect of economic goals, natu-



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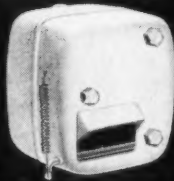
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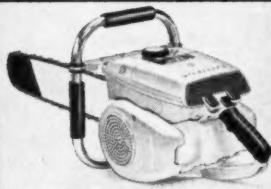
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ral philosophical fanaticism, archaic backwardness—these are some of the reproaches that were made. Their champions often forget that forest and tree plantation are two different phenomena, that, for that matter, forest management and plantation management must be different. As correct as their reproaches must be where plantation management is possible and profitable, they must be just as false where forest management can be practiced. But this is precisely the case in most of the forest acreage of Central Europe. In the presence of the situation of the lumber market and wood prices today, and also presumably that of the future, the methods of tree planting can be applied on only very modest areas, as, for example, in the best localities of the European-American poplar or, in the case of Christmas tree growing, Douglasfir, or spruce. Disregarding these exceptions, forest management must continue to be carried out in the future. Here, besides the tasks of protecting the landscape or water supply, which can be in the foreground locally, the economic goal will clearly predominate, viz., the production of the highest yields at the lowest costs. The requirement that healthy conditions be maintained, like the requirements that localities and stands be restored to healthy conditions and the measures taken for this purpose, serve this goal alone. Through its slight susceptibility to fungus infections and mass insect increases, through its greater resistance to atmospheric effects, and through its better use of the locality (rooting into various layers of the soil), the mixed forest is distinguished from the artificial single-species stand. Related to one generation, it may not attain the yield of the pure stand; in the long run, however, it is surely superior to the latter.

This evaluation has led to the condition whereby all reflections as to how the future stock of a stand shall be composed proceed from the natural forest community of a locality. The next question is, then: Can the yield of this natural forest community, in quantity or value, be increased through the mixture of tree species that are naturally lacking without the locality or the stand being thereby irresponsibly endangered? Is this goal possible, under certain conditions, through the displacement of the share of the naturally-occurring tree species alone? Which species that do not occur naturally here can be introduced and to what extent? All or at least some

species of the natural forest community will have to yield the basic stand, the skeleton. Their share must be so large that healthy conditions or the maintenance of such are guaranteed for the locality and the stand. The rest of the stock can be carried over to this or that species upon which the main stress of production is said to lie, be this through the production of especially large quantities or especially high quality. It may here be a question of domestic tree species whose share is artificially strongly increased, or of an outside species introduced as a "guest." The result of these reflections, the goal of regeneration, will always be a compromise from biological and ecological necessities and economic views. It is dictated by the requirements of conservation that the highest yields are to be aimed at while still preserving the health condition of a forest. This determines that the better, the more stable a locality is, the stronger the point of stress can be placed on economic views, but also vice versa. An example may briefly clarify this: Upon a gravelly plain in the piedmont of the Alps, which arose during the Ice Age, there grew up a natural deciduous mixed forest in which oaks and beeches were the prominent species along with several other deciduous trees. The yield of these forests was about 4 m<sup>3</sup>/year/ha. For about 250 years these stands have been replaced by pure spruce stands. Their yields in the first generation were 10-12 m<sup>3</sup>/year/ha. and in the second generation 7-9 m<sup>3</sup>/year/ha. In the third generation they decreased to the value of the natural stand and even lower. But gigantic storms, insect catastrophes, and damages caused by snow pressure only seldom permitted the stands to attain full maturity and drove the cases of damage in the course of the last 100 years to about 50 per cent of the total acreage, whereby enormous income losses and many-times-higher reforestation costs were determined. Today it is the goal to re-introduce natural species with shares of between 20 and 40 per cent and to reduce spruce to shares of from 60 to 80 per cent. The stands are supposed to thus be made more resistant, the soil improved, and the continuous yield increased to about 8 m<sup>3</sup>/year/ha. according to J. Attenberger.

The paths that are being paved toward the realization of such goals are manifold: they are formed by the locality, the stand, and the goal. Here only some of the most impor-

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tant principles and experiences can be discussed. In order to protect young growths from the extreme influences of free areas, in order to prevent the frequently unfavorable effects of free areas on the soil, and in order to be able to exploit as long as possible the increased yield of the pure stands that are being transformed, we are striving to begin the transformation under the protection and umbrella of pure stands. Exceptions to this are compulsory where soil degradation presupposes far-reaching soil treatment for which heavy machines must be employed. The period of the shelter stand can fluctuate between 5 and 40 years, depending on the light and warmth conditions of the species to be introduced. Now that the transformation in groups, i.e. the introduction of biologically effective species only in partial areas, has proved a failure, transformation is today being effected throughout the entire area of a stand, that is, the effect of the transformation is to cover an entire area. Hereby areas predominantly of between 3 and 5 ha. are taken up in one stroke. This is necessary, since such measures are possible only behind a protective fence in the presence of the great damages caused by wildlife (roe deer). Three to 5 ha., however, are the economically optimal fence sizes. Mainly there where they continue over longer periods, the transformations should be begun when the stand is still young. Between 40 and 60 years in the case of spruce and 60 to 80 years in the case

of pine are the favorable ages. Before seeding or planting the species, in many cases an improvement of soil conditions is necessary (virgin humus, surface density, etc.). Both chemical ( $\text{CaCO}_3$ , P, N) and biological fertilization (N-collecting plants) should help here and should create a favorable start for the young plants. Measures for the care of young trees (stamping out undesirable competition, the control of mixed growths) are always necessary in order to assure a successful transformation.

After several 10-year periods, in which now and then we approached the problems of transformation and collected the initial experiences, 10 years ago we began to attack them in large areas. The re-establishment of forestry enterprises and, above all, local reconnaissance and map plotting, which were carried out over ever-larger areas after the war, provided the incentive for planning on secure foundations. High wood prices and, therewith, the high income of forest owners, also permitted high expenditures for transformations, which indeed are ordinarily costly measures. Overlooking the educational expenses that must always be paid in such new-type processes, the first results are encouraging. If one considers that about one-third of the entire forest area of the country is available for processing, it becomes clear that what has previously been accomplished is only the beginning. But the struggle for locally-suitable and healthy mixed forests is proceeding on a broad front. At the end there shall be a forest that, although not resembling the virgin forest in composition and structure, combines high economic yield with resistance and beauty. Justice should be done to all the requirements that we make of the forest today: producer of large quantities of qualitatively valuable timber, protector of the landscape, area of recreation.

### Finnish Forest School

(From page 25)

stead, the use of professional books is taught in order that information can be picked out of the books at any time it is needed. For example, it is very important that the reasons for different working methods are understood and that farmers learn to take a stand toward problems independently and courageously. This way a farmer has to act if he wants to get on well.

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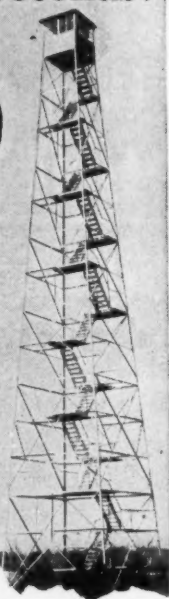


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ing too much part in discussion but tries carefully to help the students' train of thought. Later on, after the most important has become clear to all, the instructor takes the floor to make a summary. In some cases he may give a lecture, too. The next step in the instruction procedure is to let the students mark the trees for thinning. This is a competition and is done, for example, so that 100-200 trees are marked by number tags and everyone crosses on his blank those trees which should be taken out in thinning. All thinning suggestions are compared with the instructor's thinning plan, done at the same time. Everyone has a right to criticize the instructor's plan, too.

Thinning work is done after this plan, but before actual work begins, each student must appraise the amount of wood in the thinning and plan horse or tractor-hauling roads. The best plan is chosen, and the thinning work is done in the following way: The students are divided into small groups, with each group getting his own plot to work. Every student has his turn as foreman, thus getting at the same time training for this job, too. During the logging work there is an opportunity to repeat the material taught earlier, for example right logging technique, quality requirements of different lumber sorts, etc. After the thinning work the groups can criticize each other's work. In this connection, the instructor very seldom has much to add, as may be guessed. However, he has still quite a lot to say in his final speech, through which he gathers all the instructions and experiences of the day to give a summary as clear as possible.

After this perhaps not-too-detailed example we can go back for a while to appreciate the value of the instruction given to the farmers.

Until now, Finland has had more wood than was needed. In these circumstances farmers have managed to do the work in their forests with relatively small skill, as well as with relatively little professional help. Nevertheless, it is long since acknowledged that the value of, and especially the national significance of the forests are increasing and that the situation will change as a whole. Thus there has already been intensive work for centuries to increase the growth and yield of the forests, but there is still much to do. As the demand for wood seems to grow suddenly—for example, in five years' time pulpwood will be needed nearly twice as much as now—the earlier conclusions have proven



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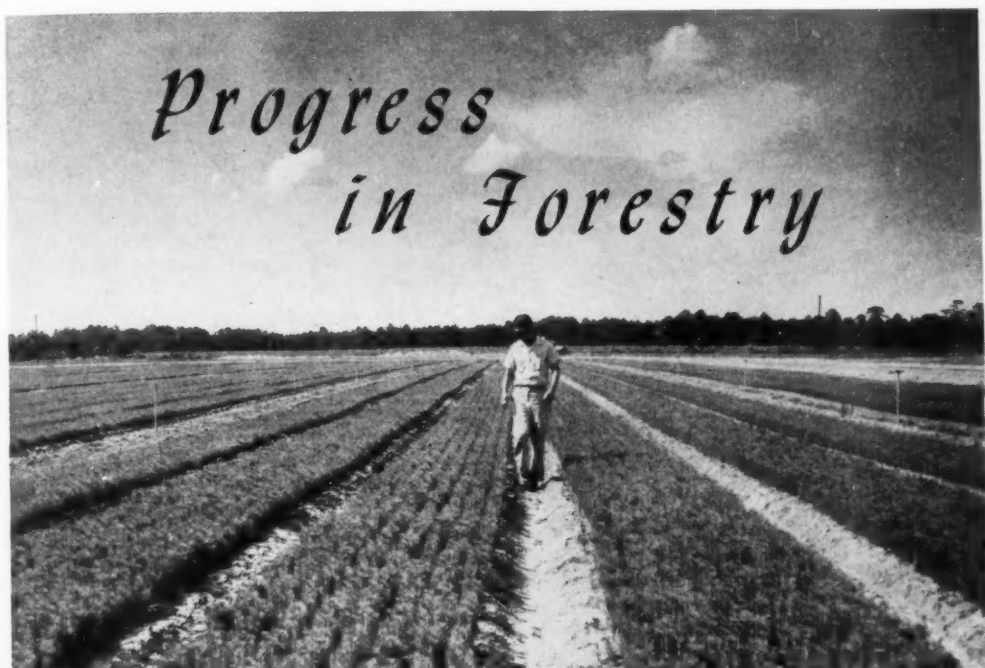
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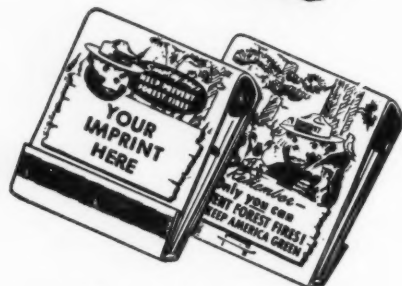
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true, and continuous procedures are thus necessary.

According to this, more professional men are needed. But farm forests are very small, averaging only 100 acres, and for this reason the management of them only by professional men is neither practical nor possible. In North Savo's province, the 2.5 million acres of farm forests belongs to 25,000 farmers who, with the skill and customs inherited from their fathers, take care of their farm and forest work quite independently. The purpose of the school is to give the same type of good skill to as many young farmers as possible. The School of Forestry for Farmers at Toivala will strive for this purpose by all means available.

### Modern Johnny Appleseed

(From page 37)

researchers found that it was more effective to induce the mice to change their eating habits and leave tree seed alone than attempt to reduce the rodent population. Chemical rodent repellents have been developed to do the training job on mice. Rodents eating a few treated seeds find them distasteful and thereafter look for something else to eat, leaving the tree seeds to germinate and grow into seedlings.

The second major advance concerns brush competition. Tree seedlings have limited opportunity to develop into healthy trees of merchantable size when crowded and overtopped by competing brush. Until recently, tools and techniques were not available to reclaim brush-covered land by seeding a new crop of trees. Two methods are now used to give the seedlings a head start. Company research foresters, co-operating with other forestry and chemical organizations, developed successful methods of applying selective chemical sprays to combat competing brush. Applied by helicopters, these carefully-formulated sprays have saved years of man-hours in brush eradication.

In the Douglasfir region, spraying is carried on largely in June and July. Mixtures of 2, 4-D and 2, 4, 5-T in diesel oil are used. Spraying is done both to prepare land for artificial reforestation and to release established conifers from overtopping brush. In recent years forestry research has made remarkable advances in the field of dormant sprays which promises more effective use of chemicals in controlling unwanted

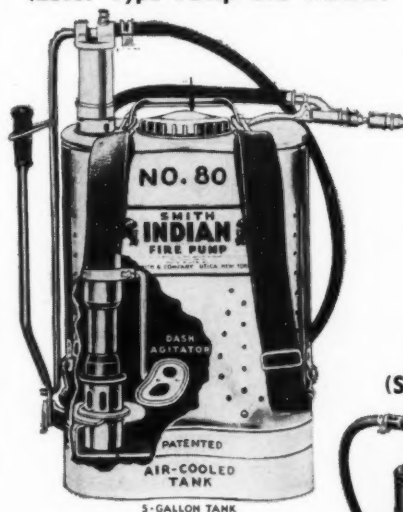


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brush species. Dormant sprays allow greater penetration of chemicals because they are applied in the winter months when the broadleaf species are in the dormant state. They also result in less damage to coniferous species. The technique used is to fly about 15 feet above the brush, spraying down into the unwanted growth of alder, wild cherry, elderberry, salmonberry, willow, and other forest weeds of little economic value.

Most of this Weyerhaeuser seeding and spraying development has been accomplished by two helicopter charter operators — Economy Helicopters of Yakima and Chem-Air, Inc., Seattle. They use Bell 47G and 47G-2 equipment.

Tons of seed are required for a large-scale aerial seeding program. The Douglasfir does not naturally produce an adequate seed crop every year. Records of cone production over many years indicate that two or three good seed crops per decade is about average. To insure an adequate supply of seed, Weyerhaeuser Company operates an extensive cone collecting and seed processing and storage program.

Each fall hundreds of weekend cone collectors are enlisted in the company program. Many of them are families who combine business and pleasure in a one or two-day trip into the forest. Cones are gathered and tagged according to elevation, species, and location of parent trees. They are sent to Weyerhaeuser Company cone processing plants in Washington and Oregon, where the seeds are extracted, treated with animal repellents, and stored for future use.

The year 1959 was a record year for Weyerhaeuser, with more than 200,000 bushels of cones harvested. These cones yielded over 100,000 pounds of seed for the reforestation program. Collectors were paid \$427,

500 by Weyerhaeuser for their spare-time efforts in gathering this bumper crop.

The 1959 crop is expected to fill the gap in the event that the next four years are poor cone years. The company has stored enough seeds to insure continuation of their large-scale aerial planting program for the next 4 to 5 years. The helicopters will fly on schedule.

In areas where a severe brush problem exists, preparation of the land for aerial seeding sometimes requires a crude tilling of the land with heavy bulldozers. This is called scarification because only the surface soil is disturbed.

Extensive tests have proven that aerial seeding on exposed forest soil is easier, quicker, and more practical than hand planting of seedlings. To date, Weyerhaeuser Company has hand-planted over 63,000 acres. While some areas still have to be planted by hand, development of direct seeding by helicopter promises a faster, more efficient method of reforesting cut-over land.

Weyerhaeuser Company has aerially seeded a total of almost 75,000 acres. Based on the success attained thus far, Weyerhaeuser expects to see an increased use of helicopters in timber management not only in its own operation but throughout the industry. In addition to the proven applications, they continue to experiment with several other possible uses of the helicopter. For instance, in the spring of 1959 they began for the first time flying experimentally (with Chem-Air as contractor) to determine whether insecticide applied by helicopters will help control cone and seed insects while cones are forming on trees.

For the industry, and for the consuming public as well, Weyerhaeuser believes helicopters are providing a valuable service.

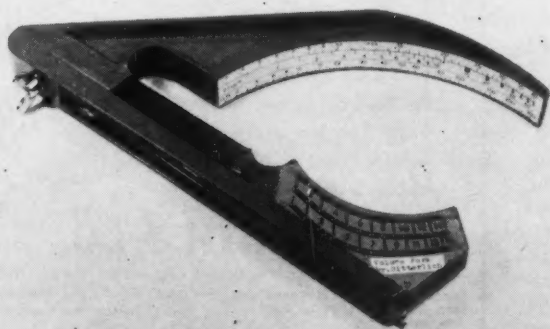
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## South's Wood-Using Industry

(From page 46)

gress during each of the past two years to do away with the capital gain treatment for timber. To do so would be a great setback for tree farming.

A problem highly significant to the wood-using industry pertains to the Workmen's Compensation Laws of the respective states. Compensation insurance is an absolute necessity. But when the rates become sufficiently high to force employers out of business, the whole plan becomes of doubtful usefulness and benefits no one. This condition is fast developing in my state of Louisiana. There compensation insurance rates for logging are now at the staggering figure of \$20.24 per hundred dollars payroll. Pulpwood rates are now only slightly lower—\$16.36 per hundred. I do not believe legislators in Louisiana realize that the wood-using industry as a whole is the largest among the state's manufacturing industries in payroll and employment. Furthermore, each of the several thousand logging and pulpwood trucks comprises a substantial, small, individual business. For example, the average dingy-looking pulpwood truck represents a \$23,000 business each year. Every cent of this sum is spent in the community in which the truck operates for stumpage, labor, gasoline, tires, garage repairs, and other items. This average truck pays \$919 in taxes each year of which the state derives \$498 and the federal government \$421. Obviously, no legislative body would knowingly and willfully close down such a source of tax revenue and employment. This lack of understanding by the Louisiana legislature is a prime example of the development of a political climate unfavorable to the wood-using industry and therefore to the tree farmer.

A matter of great importance to tree farmer and industry alike is the proposed modification in the Wage-Hour Law to increase the minimum wage and to eliminate the 12-man exemption for logging operations. Both of these changes would increase the cost of growing and harvesting forest products in southern forests. On the other hand, they would not affect these activities on the Pacific Coast at all. This would lessen considerably any competitive advantage now held by southern operations.



This matter of competition between the southern wood-using industry and the same industry in other parts of the nation and also with other industries needs more than passing comment. Since World War II competition from lumber from the Pacific Coast has largely driven southern pine lumber from important markets even within the South. The huge size of West Coast trees and the enormous volume of wood per acre as compared with southern forests results in a great saving in logging costs for western operations. Ten years ago southern pulpmills enjoyed a considerable competitive advantage over mills in other sections of the nation as regards their wood costs. Today this advantage does not exist for some mills and has been greatly reduced for the remainder.

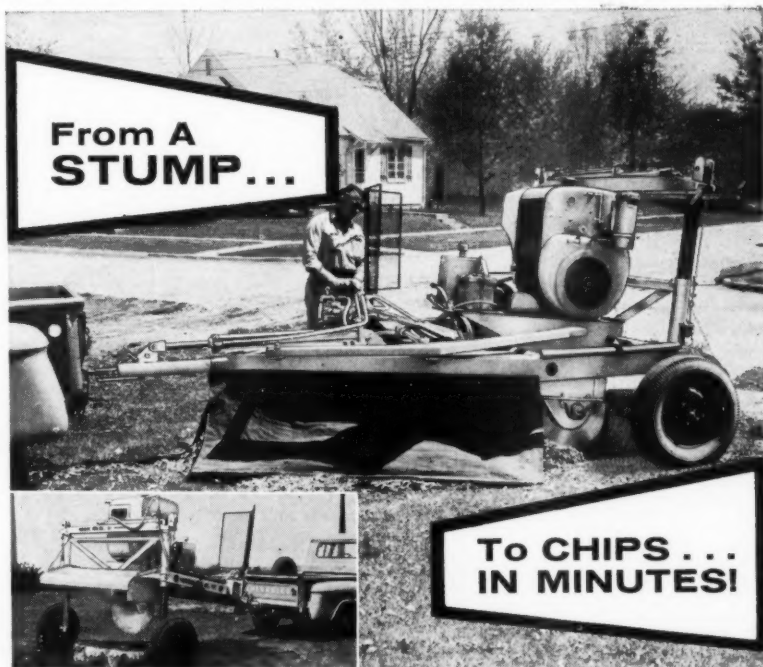
The matter of substitutes for forest products is always before us. Aluminum, asbestos, even steel are now being used for house siding. Polyethylene has replaced paper in a number of uses. Plastics are an ever-increasing competitor. The only way for forest products to remain competitive is to hold down production costs.

The proposed increase in the minimum wage would be a definite blow in favor of the competitors of forest products for the following reason. Tree farming and all forms of logging use unskilled labor. Untrained and unskilled, these workers do not and should not receive wages as high as those paid to skilled workers manufacturing aluminum, glass, steel, and similar products. Now the skilled workers—those in wood-using plants included—already receive wages in excess of those proposed by Congress. But the unskilled, untrained woods workers do not. So an increase in the minimum wage would increase the manufacturing costs of finished forest products without affecting the costs of competing products. A large part of the cost of the manufactured forest product is the direct wood cost; for kraft paper, for example, it is about one third.

Perhaps you feel that the matter of competition should be left to be battled out within industry. Maybe it should. But one important fact should be kept in mind regarding the wood using industry. This is its potential permanence with all its social and economic implications. Potential, I say, because in an unreasonable political climate it cannot survive. But in a reasonable

political climate, no industry is more stable. The first oil well in the United States, brought into production in 1859 at Titusville, Pennsylvania, has long been only a dry hole in the ground. The Mesaba range in Minnesota is no longer regarded as an inexhaustible source of high-grade iron ore. The deepest oil well and the richest source of ore will ultimately be just plain earth. Not so with a forest. Under the modern

concepts of tree farming, a productive forest can be kept productive only through use. And under intelligent use it is as ageless as the soil in which it grows. Built on a replaceable resource, the forest industry will never die. But both its economic health and the degree to which it will contribute to the welfare of the South will be greatly influenced by the political climate of the future.



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The South has the most favorable combination of natural factors for tree farming and industrial forestry of any area of like size on earth. It is for the legislators to determine the nature of its political climate.

## Historia en Capsula de la AFA

(From page 2)

años, es una relación de contribuciones substanciales hacia el adelanto de las políticas y prácticas forestales. Uno de los primeros logros de la asociación fue su exitosa campaña a favor del establecimiento de reservas forestales en las tierras públicas, las que mas tarde fueron llamadas bosques nacionales. La AFA también fue un instrumento en la creación del puesto de comisionado de los bosques, cargo que creció hasta convertirse en una gran agencia del gobierno federal, o sea el Servicio Forestal de los Estados Unidos.

La AFA ha trabajado con constancia para conseguir una firme administración de las tierras públicas. Sirvieron como trampolín para muchas de sus reformas cuatro Congresos Forestales, habiéndose celebrado el primero en 1905. Este fue responsable de la ley que colocó las concesiones de tierras cubiertas de arboles restablecidas en Oregon y California en una base de defensa-concesión, de la misma forma que el Acto que revisó las leyes mineras, impidiendo así que los mineros demandantes abusaran de los recursos madereros de las tierras públicas.

La Propiedad de Tierra Forestales es un problema en el cual la AFA tiene un interés largo y continuo. En 1947 el Programa para Bosques Americanos de la asociación recomendó un estudio, de estado en estado, de las relaciones necesarias entre la propiedad federal, estatal y privada. La asociación ha concluido estudios de propiedad de tierras en California y Minnesota y está llevando a cabo en la actualidad un estudio en Carolina del Norte.

Desde su periodo inicial la AFA ha reconocido que la selvicultura en los Estados Unidos debe ser una empresa de cooperación en la cual, el gobierno federal, los estados, y los propietarios privados, todos juegan un papel importante. Se ha dado énfasis largo y continuo a la necesidad que existe de fuertes organizaciones forestales de estados. Se ha estimulado grandemente la dirección del estado para restringir los fuegos

(Turn to page 73)



## Tracks from the past . . . ..... heading to the Future

Along this green avenue in Washington State's South Olympic Mountains, Simpson loggers have moved trainloads of old-growth Douglas Fir, Western Hemlock and Western Cedar since the 1890's.

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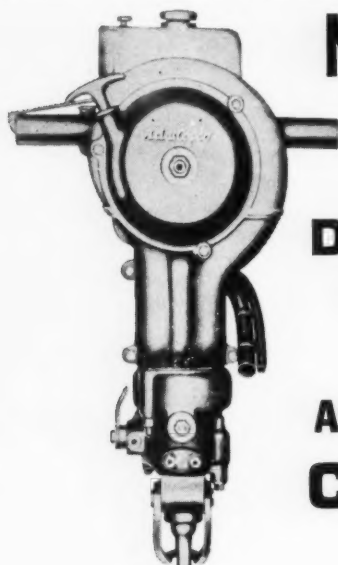
This is the story of private forest enterprise throughout the Western United States, a story we proudly join in presenting to delegates from all nations attending the 5th World Forestry Congress at Seattle.

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Presenting memorandum are (left) Secretary of Defense Thomas S. Gates, Jr., Secretary of the Interior Fred A. Seaton, Assistant Secretary of the Interior Ross Leffler

## MEMORANDUM OF UNDERSTANDING

Secretary of Defense Thomas S. Gates, Jr., and Secretary of the Interior Fred A. Seaton on July 11 signed a Memorandum of Understanding for the Conservation of Fish and Wildlife Resources on Military Installations at a noon ceremony in the Pentagon.

During the ceremony Secretary Gates said, "I am happy that we can meet here today to sign this joint Memorandum of Understanding between the Departments of Defense and Interior. It recognizes and confirms the relationship and responsibilities of the two departments with respect to the management of fish and wildlife resources on military reservations. I have long been personally interested in and a firm supporter of the Department of Defense conservation program. I welcome this opportunity to affirm our intentions of doing the best possible job in providing for the wise use of the natural resources on property under the control of the Armed Forces. This agreement recognizes the Department of the Interior as the advisor to the Department of Defense in conservation matters. The nation's conservation program is a public trust, and we welcome the advice of those persons learned in the field of resource management . . ."

Secretary of Interior Seaton commented that "it is a pleasure to join in signing this Memorandum of Understanding, one which underscores again the importance of fish and wildlife conservation to the United States. With the Department of Defense, the Department of the Interior is delighted to exchange information which can improve conservation techniques, to plan new conservation programs, and to work with state and local conservation agencies to safeguard these valuable resources of fields and lakes and streams under military jurisdiction. We enter on this co-operative effort with enthusiasm and look with hope toward the beneficial results it will produce in the years ahead."



## Historia en Capsula de la AFA

(From page 70)

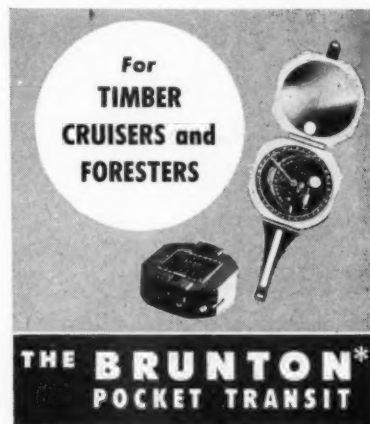
y para reformar los impuestos. AFA también ha alentado la dirección del estado en otros campos, tales como educación pública, producción y dirección de criaderos de arboles y co-operación con los propietarios privados en la administración de tierras forestales y en el mercado de productos forestales.

La protección de los bosques contra fuegos, insectos y enfermedades siempre ha sido una política cardinal de la AFA. La empresa de mayor ambición y de más éxito de la asociación en el campo de la restricción de fuegos forestales fue el Proyecto Educativo Forestal del Sur iniciado en 1928. Estos luchadores de "Dixie" pasaron el Sur demostrando con renombrado efecto los males de los fuegos forestales sin limites. De esta centura data grandemente el verdadero progreso en la restricción de fuegos en el Sur. En 1956, la AFA escenificó la Conferencia Sureña para la Prevención de Fuegos Forestales para darle aun mas impulso

a una opinión pública militante en la prevención de fuegos forestales.

Respecto a los insectos las enfermedades, la AFA ha recomendado sin cesar la expansión de investigaciones para combatir estas amenazas forestales. La asociación tuvo mucha influencia en conseguir que se pasara el Acto de la Prevención de Insectos Forestales en 1947 y en 1950 la AFA organizó un Comité Consultor de Insectos Forestales para ayudar en los esfuerzos de toda la nación para combatir insectos y enfermedades forestales.

La cristalización de la opinión pública mediante la educación siempre ha sido uno de los principales fines de la asociación, siendo la Revista "Bosques Americanos" su organo de información. Un proyecto actual de educación de la AFA es la preparación de una serie de materiales de ayuda en la enseñanza de la preservación los que servirán de ayuda a los maestros de las escuelas elementales superiores en todo el país.



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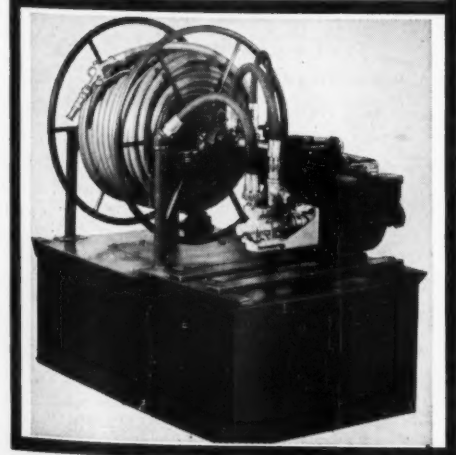
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## A Capsule History of AFA

(From page 2)

sponsible for the legislation which put the heavily-timbered Oregon and California revested grant lands on a sustained yield basis, as well as the act which revised the mining laws, thereby preventing mining claimants from abusing timber resources on public lands.

Forest landownership is a problem in which AFA has taken a long and continuing interest. In 1947 the association's Program for American Forestry recommended a state-by-state study of the desirable relationships between federal, state, and private ownership. The association has completed landownership studies in California and Minnesota, and is presently conducting a study in North Carolina.

From its inception AFA has recognized that forestry in the United States must be a co-operative enterprise in which the federal government, the states, and private owners all play a prominent part. Early and continuous stress was laid on the need for strong state forestry organ-

izations. State leadership in fire control and tax reform has been strongly urged. AFA has also encouraged state leadership in other fields such as public education, production and distribution of nursery stock, and co-operation with private owners in the management of forest lands and in the marketing of forest products.

Protection of forests from fire, insects, and disease has always been a cardinal policy of AFA. The association's most ambitious and most successful undertaking in the field of forest fire control was the Southern Forestry Educational Project initiated in 1928. These Dixie Crusaders toured the South portraying with telling effect the evils of unrestrained forest fires. Real progress in fire control in the South dates largely from this venture. In 1956, AFA staged the Southern Fire Prevention Conference to arouse still further a militant public opinion for forest fire control.

In regard to insects and diseases, AFA has consistently recommended

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expanded research to combat these forest menaces. The association was influential in obtaining passage of the Forest Pest Control Act of 1947, and in 1950 AFA organized a Forest Pest Advisory Committee to assist in the nation-wide efforts to combat forest insects and diseases.

Crystallization of public opinion

## L'Histoire en Capsule de l'AFA

(From page 2)

L'AFA a travaillé constamment pour établir une administration bien fondée des terres publiques. Des tremplins pour ses nombreux programmes et réformes étaient quatre Assemblées forestières, la première en 1905. Elle fut responsable de la législation qui a placé les concessions de terres couvertes d'arbres en l'Oregon et en Californie sur une base de revient soutenu, ainsi que de l'acte qui réorganisa les lois minières, empêchant ainsi les revendicateurs miniers d'abuser les ressources forestières sur les terres publiques.

La propriété des terres forestières est un problème auquel l'AFA s'intéresse depuis longue date. En 1947 le Programme de l'association pour

through education has always been one of the main objectives of the association with its information arm being AMERICAN FORESTS magazine. A current AFA education project is preparation of a series of conservation teaching aids for upper elementary grade school teachers throughout the country.

les Forêts américaines a proposé des études portant sur un état après l'autre des rapports désirables entre le Gouvernement fédéral, les états, et les propriétaires privés. L'association a complété des études sur la propriété des terres en Californie, et en Minnesota, et elle fait actuellement une étude dans la Caroline du Nord.

Dès sa création, l'AFA a reconnu que le sylviculture aux Etats-Unis doit être une exploitation de coopération entre le Gouvernement fédéral, les états, et les propriétaires privés, dans laquelle tous jouent un rôle important. L'on a souligné dès le début d'une façon continue qu'il fallait avoir des organisations fores-

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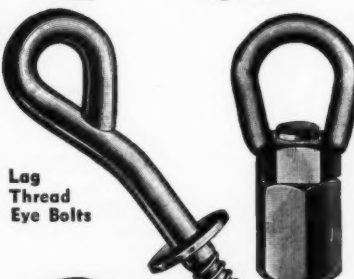
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tières d'état qui soient solides. La direction des états en ce qui concerne de contrôle des incendies et la réforme des contributions a été sérieusement demandée. L'AFA a encouragé aussi la direction des états dans d'autres affaires telles que l'éducation publique, la production et la distribution des produits pépinières, et la coopération avec les propriétaires privés dans l'administration des terres forestières, ainsi que dans la vente des produits forestiers.

La protection des forêts contre les incendies, les insectes et les maladies a toujours été la politique principale de l'AFA. L'entreprise la plus ambitieuse et la plus heureuse de l'association au champs du contrôle des incendies forestières fut le Projet d'Enseignement de la Sylviculture du Sud, initié en 1928. Ces Croisés de Dixie ont fait le tour du Sud étalant avec force les maux causés par les incendies forestières hors contrôle. Des progrès réels dans le contrôle des incendies dans le Sud datent largement de ce temps. En 1956 l'AFA a présenté la Conférence Méridionale pour la Prévention des Incendies forestières pour éveiller encore plus l'opinion publique militante à la nécessité pour le contrôle des incendies forestières.

En ce qui concerne les insectes et les maladies, l'AFA a proposé constamment des études étendues pour combattre ces menaces sylvestres. L'association usa de son influence pour obtenir l'adoption de l'Acte pour le Contrôle des Pestes du Forêt en 1947, et en 1950 l'AFA a organisé un Comité Consultatif sur les Pestes forestières pour aider dans les efforts nationaux pour combattre les insectes et les maladies du forêt.

La cristallisation de l'opinion publique par l'intermédiaire de l'enseignement a toujours été un des objets principaux de l'association, l'organe des renseignements étant sa revue, l'American Forestry Magazine. Un des projets actuels de l'AFA pour l'enseignement est une série d'aide-mémoires pour l'enseignement de la conservation qui sont en préparation pour les professeurs et instituteurs de l'enseignement primaire avancé national.

### Norway Woodlots

(From page 40)

tives. One was direct government seizure and control of these properties; the other was the formation of large, "voluntary" management units (composed of many owner-ships) to be managed for the owners



by the Forest Service. This led to an immediate reaction by the Forest Owners Association, which proposed what is termed "the third alternative"—that the forest owners effect the required improvements on their own. Ultimately this proposal led the association into the field of forest production.

It should be recalled that the forest owners were, at this time, paying a forest investment levy. These funds were available to pay for the services of foresters, and among the many activities covered was management planning.

More or less forced into forest production activities by threat of further government controls, the Forest Owners' Association implemented, and to a certain extent subsidized, a program of custom management planning for its members. With funds available to pay for these services from levies, and since those owners operating under written management plans are extended certain privileges under the forestry law, the program began to move.

Soon it was found that some recommended cultural activities had to be carried out at times when some of the owners were engaged in other activities and could not carry them

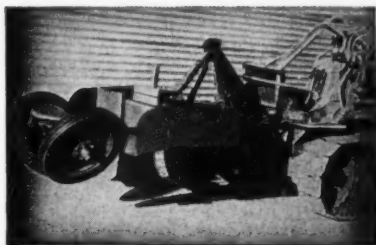
out. This led to the establishment of permanent work crews which are available to carry out cultural operations at the proper time at prevailing labor rates.

The chief advantage of this private-enterprise approach soon became evident: the flexible nature of a non-institutional organization permits the procurement of foresters, forest technicians and woods labor as soon as the demand for their services is felt. And the demand has increased steadily since the program was inaugurated.

#### Forester—Owner Relations

The most profound result of the philosophies underlying Norwegian forest policy is one affecting forester-owner relationships. Once provision was made for financing cultural operations, it became possible for the Norwegian forester to look at the woods and use his knowledge without fear of being deemed impractical. He could then recommend what he knew was best for both the woods and the owner, where we are too-often compelled to base our recommendations on what we judge the owner will find acceptable.

Then too, the Norwegian foresters have become educated; they have ac-



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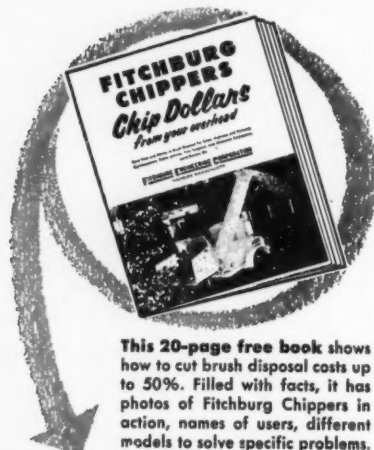
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quired some new viewpoints. It is now clearly recognized that as long as land remains in private ownership all improvements in levels of management must be based upon the owner's views of progress. His hopes and aspirations—not those of foresters—and his economic ability to attain improved levels are the critical factors.

This involves recognition of the fact that foresters must work first with people, then with trees, and that it is impossible to manage forests without first learning to manage forest owners. In sum, this new-style forester is a far cry from a mere advocate of the "normal forest!" To quote one Norwegian forester: "You can plan for the normal forest without ever leaving the office. This must be wrong." He concluded that a more reasonable objective is something less than the normal forest—less by the amount in which the owner's financial ability, interest, and forest education falls short of reaching it.

The point here comes to rest easily. The profound dignity with which an American forester, forestry educator, or researcher can assert that "these are people problems—questions of sociology rather than forestry" is shocking. The attitude implied is both illogical and unprofessional. If your tooth aches you see a dentist, not a psychoanalyst.

### The Value of Personal Contact

Norwegian experience has shown that personal contact between forester and owner, preferably in the forest, is the best—and in the long run the most efficient—method of owner education. This thinking shows up in most programs directed at private owners. Invariably, these programs aim to create a personal contact situation between forester and owner which is rigged in favor of the forester. For example: the

public forester is backed by the Forest Protection Act. And foresters are able to provide funds to carry out their recommendations. Foresters—especially government foresters—also recognize that there are such things as negative educational values: that a potentially "educable" owner can be converted to an attitude antagonistic toward foresters and forestry by failure to provide advertised services promptly.

### Professional Respect

Much has been done in Norway to add respect and professional stature to the title "forester." Most of this, of course, had to be earned. However, two positive steps were taken which should provide meaningful examples to American foresters.

Units of timber measurement caused almost as much confusion in Norway at one time as they do now in the southeastern United States. Foresters played key roles in the battles which led to uniform standards of measurement.

Then, about 1920, there occurred some arguments regarding systems of timber management. These reached the public, to the embarrassment of many foresters. Through intensified research, debate, and with a spirit emanating from professional best-interest, these questions were resolved as far as they concerned the public. In other words, the general biological and managerial facts of Norwegian forestry life were set forth, examined, and for practical purposes agreed upon. The result was and is that all Norwegian foresters are likely to talk the same language to forest owners—bringing to them the best information available—while debate and discussion of the "fine points" or improvement in technique goes on unhindered within the profession.

It is inconceivable that the respect for foresters prerequisite to owner-education can be obtained when, for example, two groups of U. S. government-agency foresters collide all over the Southeast advocating two divergent systems of management for a single pine species!

### Regulation, Subsidy, or Education

It is commonly asserted that there are three ways to promote improved forest practices on private ownerships: regulation, subsidization, or education. The writer's brief sampling of "national forestry histories" will not bear this out. While any

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combination of these factors will result in progress, *none of them alone* is likely to result in substantial success.

Actually, regulation may exert only a negative influence unless coupled with one or both of the others. And as far as forest investment is concerned, regulation plus subsidy is effective where regulation plus education is relatively ineffective. By the same token, subsidization alone does not produce satisfactory results. And nowhere in the world is there any proof that education, by itself, can do the job.

Norway was perhaps fortunate in being surrounded by neighbors with experience in "small-owner procedures." Also, being a new country, it was able to formulate new programs unhampered by strong traditions and could experiment a little. Judging from existing forest policy, it would be safe to assume that, for Norway, the established combination of regulation, subsidy (cultural and investment levies plus some direct government subsidy) and education is the best available procedure. It is yielding results.

It is unlikely that Americans would accept government regulation of private forest resources. It is interesting, however, to speculate on the two remaining avenues of approach. Subsidization is an accepted approach to the solution of American economic problems, although the implication of the word—referring to the support of uneconomic activities—augurs poorly for the long-run chances of owner education. And education, in all its semantical frames of reference, is presently being touted as our best hope for solving the small-owner problem.

Assuming that improved forest practice is in the interest of forest owners and the nation, it would seem that the best course left open for U. S. forest policy would be to

find a form of subsidization which would do the most in setting the stage for effective forest-owner education.

If a concept of forestry evolution has validity, then the problem of upgrading forest management practice levels on individual ownerships becomes recognition of factors—both positive and negative—which permit or hinder the evolutionary process. After these factors have been isolated, direct action programs can be devised to promote conditions which permit better management on these ownerships.

The questions of eliminating hindering factors, if the experience of other countries applies, will prove to be the most difficult, since they involve stepping on tradition.

In all cases where countries have bridged the gap between forest exploitation and intensive management, they have first had to pay a price. In some cases the price has been strong forest regulation by the national government—but this regulation has never worked by itself. Forestry practice tends to lag—even with the most strict regulation—until some means is devised to compel or encourage financial investment in cultural operations by forest owners.

Forestry history is too often a monument to wood scarcity. Norway stands as proof that this need not be the case. The lesson for forest economists, however, is quite clear: to argue that the laws of supply and demand apply fully to forestry is to argue too little and too late.

The Norwegians have, in effect, met their subjective small-owner problems head-on with subjective solutions. They have turned these problems into opportunities by assessing the problems, paying a minimum price, adopting a realistic approach, and by turning from debate to work.

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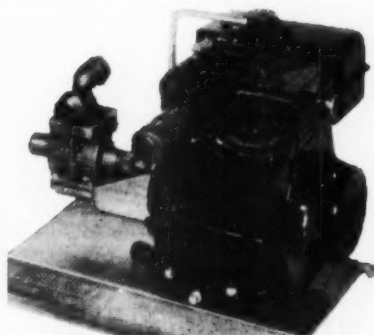
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**Hugh H. Bennett**

(From page 6)

parts of the legacy that make the whole, so painstakingly put together piece by piece, were each significant milestones in conservation history. They include the development of a new kind of federal agency, of a new science—the science of soil and water conservation—and of principles and concepts that have become lasting.

Hugh Bennett recognized land for what it is: a complex resource within a complex environment. Soil is but one part of the land, he believed, and to protect and improve land for permanent productivity it had to be considered in terms of all its component parts: soil, slope, climate, susceptibility to depreciation by erosion, over-cropping, or other processes of deterioration. He believed there was no quick and easy way to soil conservation, no panacea such as terracing or any other single practice indiscriminately applied. These beliefs guided him in building from scratch a technical agency to plan and carry out a national program of soil conservation, and in developing a scientific approach to land use problems.

Bennett recognized that the agronomists didn't have all the answers to farm and ranch land problems. Nor did the engineers, the foresters, the biologists, the soil scientists, or any one of all the physical and biological scientists. But together they could diagnose and prescribe. Their combined skills needed to be brought together in a new kind of professional conservationist out on the land itself — on individual farms and ranches and in small watersheds.

Thus Bennett built his organization. In the early days, there was much knocking together of the heads of agricultural engineers and agronomists, to name but two, who, as Bennett once said, "at first worked together like so many tomcats and bulldogs in the same pen."

The concept that land varies from field to field and that it can be classified as to its capability is still the heart and core of soil and water conservation operations throughout the nation and in many other countries. So too is the concept that each farm or ranch or small watershed must be considered as a whole, and not planned or treated piecemeal. This continues to be the keystone of the new land use pattern that has spread



across millions of American acres in the past quarter century. So too is the principle that land management cannot be separated from water management. Bennett never claimed credit for the soil conservation district idea. He said, "It was a synthetic product derived from the collective thinking of soil conservationists under the surge of necessity." But he was one of the sponsors of this idea that has spread to nearly 2,900 communities under the local leadership of more than 14,000 private citizens who guide and direct soil and water conservation programs and co-ordinate the technical assistance of the Soil Conservation Service and other state and federal agencies.

Hugh Bennett, the man of the soil, has returned to the soil. He lies under a great oak on a hillside in beautiful Arlington National Cemetery. His monuments are many, and they will continue to increase—on the croplands, on the pastures, on the range, and along the little waters of our American landscape.

## Finnish "Sauna" Cottage

(From page 19)

the direction only at the last moment. And they had "bombs" too—a supply to which there seemed to be no end.

I had gotten used to taking sunbaths on that very rock, but now it was used by those "bombers" as an "air base," and on top of the rock the gulls had their nest with three big eggs in it.

"This is going to be another nuisance," I thought. "The little stone-chatters were masters of my fireplace, and now the gulls have occupied my favorite place for sunbath—no coffee, no sunbaths."

I had to keep on defending myself against these "stukas" for a couple of weeks, until one morning the eggs had disappeared from the rock and I could see three little gulls swimming farther out in the bay in the wake of their parents.

The bay is a favorite place also for wild ducks, and sometimes you may see even a merganser there.

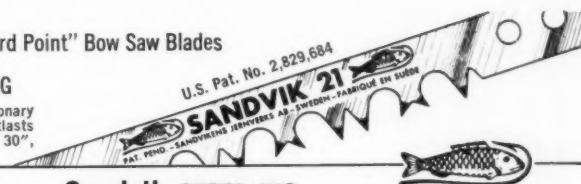
One early morning I happened to see a fierce fight between a mother merganser and a mother duck. I cannot tell what the basic reason for the fight may have been, but in any case they were fighting in earnest, using their wings, beaks, and feet all at the same time, and the little ones of both bird mothers were waiting

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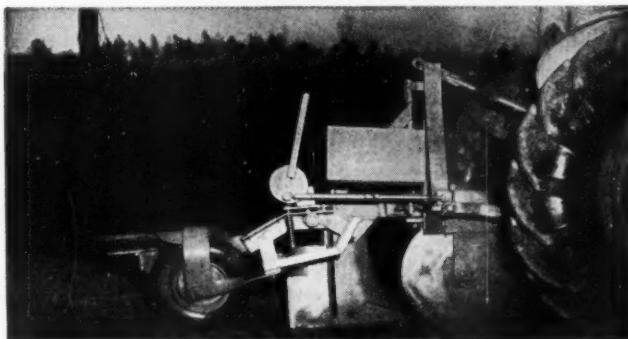
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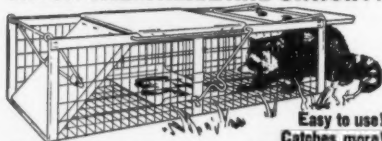
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with excitement to see what the result of all that would be.

Finally the duck had to give up fighting, and just guess what happened next? The poor duck had to leave the whole shore all alone and flee further out to the open sea, for its little ones joined the victor—the merganser!

Proud as the commander of a great armada, the merganser now swam to and fro on the bay with her neck even more erect than before, for now she had more than a dozen little ones in her wake.

It is true that there was nothing wrong with that fine "fleet," except that all the "ships" were not the merganser's own, but part of them had been stolen.

In the backwoods the old, decayed stumps are full of moles' holes, and I have also happened to see a glimpse of the small creatures by which those holes are made.

One day I heard a peculiar rattle underneath my cottage, and after a while a steel-gray head, which resembled that of a mole, emerged. The head was, however, a good deal bigger than that of a mole, and the color of the fur was different. The creature made a hissing sound and showed its white, sharp teeth. When it finally came forth, I noticed it was nothing but a mink!

I did not know that on the opposite shore of the island there was a mink farm. Later on I learned that every now and then one of the minks runs away to see what the free world looks like.

The owner of the farm did not, however, worry about these run-aways, for he knew that they cannot get anywhere from the island. Besides, since the minks were no longer able to find their food in freedom, hunger finally compelled them to return to the mink farm.

## Reading About Resources

(From page 47)

"3. Changes in major land use in the future will be made with more difficulty and will be accompanied with more stresses and strains, public and private, than past shifts in land use. . . .

"4. Change within each land use is likely to be more important than change between land uses. The area of land used for agriculture will change comparatively little, but the intensity of its use will change greatly. The same is true, in gen-

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## HAS IT OCCURRED TO YOU?

There are many members and friends of The American Forestry Association who find it impractical to contribute to its educational activities during their lifetime. Gifts in the form of a bequest are welcomed. Officers of the Association will gladly consult at any time with those who wish to know more about designating gifts for educational work in forest conservation.

Following is a paragraph suitable for incorporation in wills:

"I hereby give, devise and bequeath \_\_\_\_\_ to The American Forestry Association, Washington, D. C., a non-profit District of Columbia corporation, or its successor, or successors, for the purpose of promoting the corporate activities of said Association."

**THE AMERICAN  
FORESTRY ASSOCIATION**

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eral, for all land uses. The intensive margin of use will be more important, comparatively, than the extensive."

Within this framework, the treatment of forest land use will be particularly interesting to members of the World Forestry Congress. Here is a relatively brief introduction for the visitor to the over-all situation in America, with the present and future of U.S. forestry best described by the statement that "Forestry has been dominated by [the] original virgin forest situation. To some extent it still is. The nation and forestry as an industry have not yet fully faced up to the technical and economic problems of growing trees purposefully, beyond merely harvesting them. Some important beginnings have been made, it is true, and much further progress will surely be made in the next decade or two."

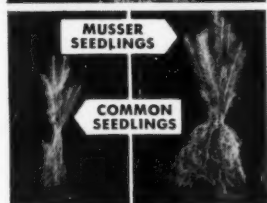
For years the wisest foresters have understood that they must be land-use specialists, at least to a degree, if they are to be completely effective forest managers. For these men I would recommend **Land for the Future** as an important contribution to the small stock-pile of ready information. It's not a great book, but like a can opener, it will be hard to do without.

### New and To Note

**New Water for a Thirsty World**, by Michael Salzman. Science Foundation Press, Los Angeles. 210 pp. \$5.95. A spirited exposition of the world's darkening water situation. Intelligent, literate, and well argued.

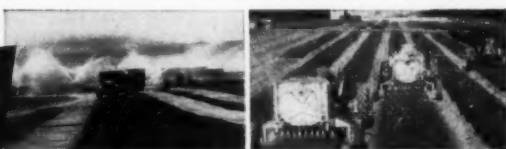
**Better Vacations for Your Money**, by Michael Frome. Doubleday & Co., N. Y. 183 pp. \$2.95. Experienced travel writer Frome here presents a handy, beautifully illustrated introduction to the possibilities for vacation travel, especially family travel. The book is endlessly tempting; the data is absolutely authentic. Only the book's brevity disappoints, for there is not space for the author to tell you all. He suggests the adventures that await his readers. He does not—and cannot in these few pages—lead them by the hand. Michael Frome provides the impetus, the direction. Only such highly specialized publications as are available from the AAA, the oil companies, the local chambers of commerce, offer that meticulously detailed information which can soften the jolts on mile-by-mile traveling.

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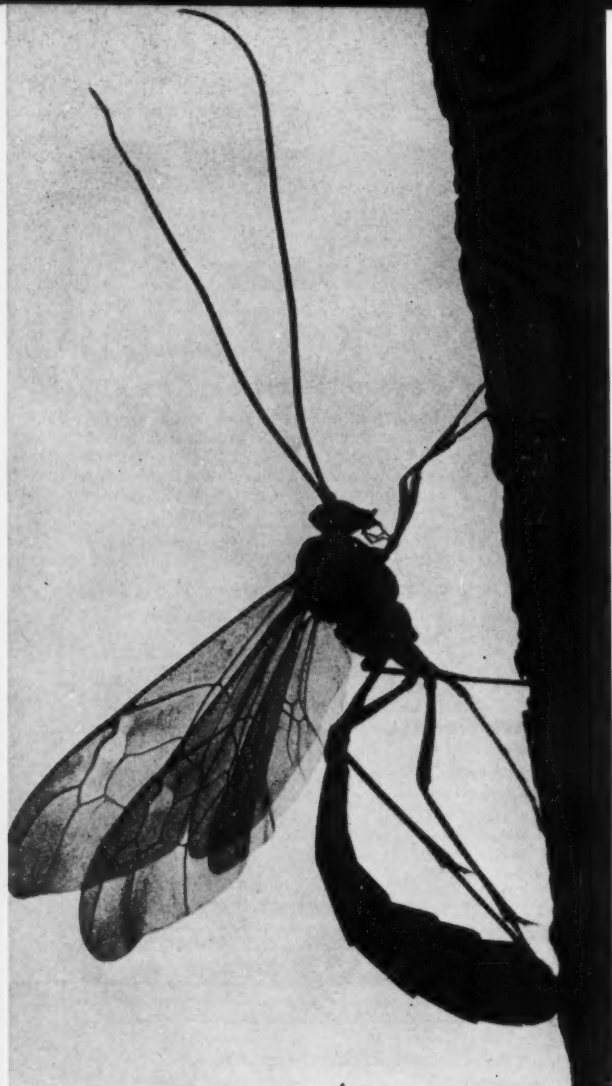
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## Feature Photos of the Month

*Photos used on this page will be of unusual rather than esthetic qualities and subject matter will be restricted to scenes, events, objects or persons related to the use, enjoyment or unique aspects of our renewable natural resources. For each picture selected, AMERICAN FORESTS will pay \$10*

Silhouetted against the light on the trunk of a tree is an ichneumon fly (*Ophion macrurum*). This large member of the wasp family is one of man's allies because it searches out and destroys the larvae of some of our large, destructive moths. (Photo at left)

A female Polyphemus moth, one of our beautiful, though at times destructive, giant North American moths. Females of this species are capable of laying several hundred eggs, and the larvae that hatch from them grow to a large size and attack the foliage of oak, birch, and many other trees. They are kept under control to some extent by the ichneumon fly.

**Photographs submitted by Harold V. Green, Montreal, Canada.**







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## NEW HOMELITE



You can cut the big ones faster and lay 'em on a dime with this new more powerful Homelite 900G gear drive chain saw.

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You get other features that cut your downtime, too. New powdered steel clutch spider lasts longer. Gears are stronger, wider (with a choice of two ratios: 2.8 to 1, 3.5 to 1).

Set your sights on more cutting profit with more cutting power . . . try the new Homelite 900G in a free demonstration. And ask your dealer to show you how all the chain saws in the new full Homelite line can make money for you.



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